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Some Observations on the Phagocytosis of Br. Abortus by Polymorphonuclear Leucocytes

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Some years ago Huddleson (1935; 1936*a*, *b*; Huddleson, Johnson and Meyer, 1936; Meyer and Huddleson, 1936) introduced the so-called opsono-cytophagic test as a means of differentiating between cattle susceptible and resistant to *Br. abortus* infection. Briefly his technique was to mix equal volumes of citrated whole blood and a suspension of *Br. abortus*, incubate for 30 minutes at 37° C. and examine suitably stained smears for the presence of polymorphonuclear leucocytes showing phagocytosis. It was claimed that the polynuclears from resistant cattle showed a high degree of phagocytosis whereas those from susceptible cattle showed little or none. The writer (Priestley, 1937) has criticised these conclusions and has furnished evidence, based on an examination of 278 animals, which does not support Huddleson's claims. Since the publication of that article Huddleson (in a personal communication) has suggested that the discrepancy in the results is due to the use of a suspension containing two few bacilli; he claims that the results are more clear-cut when thick suspensions are used. It was decided, therefore, to test this point and to try to elucidate the underlying causes of the phagocytosis. The results of the work are presented in this paper.

Technique

The technique adopted was essentially similar to that advocated by Huddleson and used by the writer in his previous work.

The animals examined were shorthorn heifers kept on the Romney Marsh, most of which were being used for the estimation of a minimal infective dose of *Br. abortus* by the conjunctival route (details of these animals will be furnished in a future publication by McEwen, Priestley and Paterson). Some of the animals (Nos. 17, 27, 45, 56 and 59) were in an experiment devised to test the innocuousness of a certain vaccine.

Five c.c. amounts of blood for the phagocytosis test were collected from the jugular vein into bottles containing 0·4 c.c. citrate solution (12·5 per cent. sodium citrate in 4·25 per cent. sodium chloride). Blood for the agglutination test was collected separately into tubes containing no anticoagulant. This precaution was necessary as it has been found that, on dilution, plasma from citrated blood clots and interferes with the reading of an agglutination test.

The bacilli were grown for two days on liver agar and then suspended in distilled water containing 0·6 per cent. sodium chloride and 0·5 per cent. barium chloride. Except for the first experiment in which various densities of suspension were tested, the suspensions used had a density equivalent to 1·5 times tube 10 of the Brown $BaSO_4$ scale, *i.e.*, 15 times as dense as tube 1. Also, except for part of experiment 5, a virulent strain of *Br. abortus* was used throughout the work.

0·5 c.c. amounts of blood were thoroughly mixed with 0·5 c.c. amounts of suspension in narrow tubes and incubated for 30 minutes in a water bath inside an incubator kept at 37° C. The water level was so arranged that it was below the top of the fluid in the tubes, thus ensuring constant mixing by convection currents; moreover, the tubes were thoroughly shaken after 15 minutes' incubation. Not more than 20 mixtures were incubated in any one period of 30 minutes, so that the time elapsing between the making of the first and last smears was relatively short and could not appreciably affect the results.

The smears were dried in air and stained with May-Grünwald.

At least 100 polymorphonuclear leucocytes were counted, the cells being regarded as showing phagocytosis when they had engulfed within them about ten or more bacteria. As Huddleson has indicated, with relatively thick suspensions there is a much more pronounced "all or none" effect, *i.e.*, generally the leucocytes either show no phagocytosis at all or else they have masses

of bacteria within them. Obviously such a fact makes the counts much more consistent and accurate.

Results

The experiments were actually done in three steps as indicated in the tables, but for purposes of continuity in the text they have been divided into separate parts.

Experiment 1.

To test the effect of varying the density of the suspension on phagocytosis six heifers were bled and their bloods mixed with suspensions prepared from a virulent strain of *Br. abortus* and standardised to 15, 7·5, 3·0 and 1·5 on the Brown scale. The counts proved so interesting that, to avoid any personal bias, the slides were mixed up, the identification marks being hidden, and recounted, the results being tabulated when all the slides had been examined. In this experiment 200 polynuclears were examined. The results are shown in Table I.

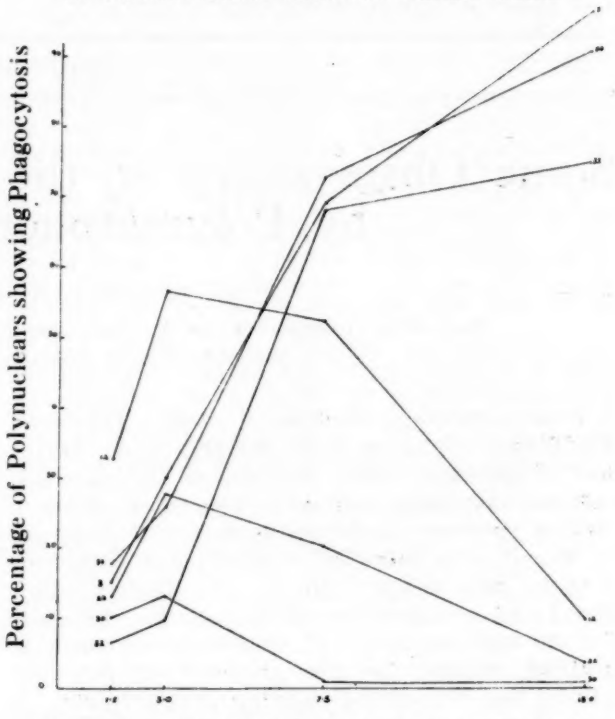
Table I

Showing the effect of varying the density of the suspension on the number of polynuclears showing phagocytosis

Heifer Number.	Suspension Density.				Agglutination Titre.
	15	7·5	3·0	1·5	
3	193	138	60	30	1 : 160
12	19	105	113	66	<1 : 10
22	7	41	55	26	<1 : 10
30	1	2	26	20	<1 : 10
32	150	136	19	13	1 : 40
54	182	146	52	36	1 : 40

This table brings out two interesting points. First it is abundantly clear that suspension density is a factor of prime importance. With a density equivalent to 15 the three samples 3, 32 and 54, are sharply differentiated from numbers 12, 22 and 30. As the density is decreased so the differentiation becomes less and less pronounced until, at very low densities all samples are approximately the same. This is perhaps more clearly seen from the graph in Fig. 1. The probable explanation of this finding will become clear later. It is interesting to note that a negative zone in the region of antigen excess is present in those cases where the serum is completely negative to the agglutination test; thus, for instance, blood number 12 shows 9·5 per cent. phagocytosis with a suspension equivalent in density to 15, 52·5 per cent. phagocytosis with a suspension equivalent to 7·5, 56·5 per cent. with a suspension equivalent to 3·0 and 33·0 per cent. phagocytosis with a suspension equivalent to 1·5.

Fig. 1, Showing the Effect of Varying the Density of the Suspension on the Percentage of Polynuclears showing Phagocytosis



Secondly, this experiment indicates that, with a suitable suspension the degree of phagocytosis is related to agglutinin titre. Thus it may be seen that the three animals showing marked phagocytosis possess an agglutinin titre of 1 in 40 or above, whereas those showing little phagocytosis are negative to the agglutination test.

Experiment 2.

In view of the above findings it was decided to bleed and test the cattle remaining on the Romney Marsh at the conclusion of the experiments referred to above. Thirty-four samples were obtained. These samples were tested for phagocytosis against a virulent strain, 100 polynuclears being examined on each smear. The agglutination titre after 24 hours incubation at 37° C. was also noted. The results are shown in Table II.

Some of the results were contrary to expectation in that some of the samples, *e.g.*, Nos. 5, 17, 27, 36, 47 and 54, from animals negative to the ordinary agglutination test showed a considerable degree of phagocytosis. In all of these samples it was noted that there was evidence of clumping when smears were examined microscopically. Some of the agglutination tests were, therefore, reincubated (some of the tubes had been discarded before the observation of microscopic clumping had been made), and these results are also shown in Table II. It will be noted that the supposed

Table II

Showing the phagocytosis of virulent and non-virulent *Br. abortus* in relation to agglutinin titre.

Heifer Number.	Agglutinin titre after incubation for		Percentage of polynuclears showing phagocytosis of	
	24 hours.	48 hours.	Non-virulent strain.	Virulent strain.
3	1 : 20	—	43	83
4	1 : 640	—	49	79
5	0	1 : 20	80	89
7	1 : 160	—	51	64
9	1 : 640	—	28	66
10	1 : 320	—	25	32
11	1 : 320	1 : 640	56	71
13	1 : 160	—	35	43
16	1 : 80	1 : 160	83	92
17	0	1 : 80	87	93
18	1 : 640	1 : 1280	52	67
19	1 : 10	—	49	46
22	0	0	0	0
25	1 : 160	1 : 320	35	48
27	0	1 : 10	92	93
28	1 : 80	1 : 320	93	85
30	0	0	0	0
31	1 : 160	1 : 320	37	42
32	1 : 20	—	74	58
36	0	1 : 40	63	72
37	1 : 320	—	49	76
39	1 : 320	1 : 640	29	33
41	1 : 640	—	54	84
42	0	—	0	0
43	1 : 80	1 : 320	65	79
45	0	1 : 10	36	43
47	0	1 : 20	89	87
50	0	—	1	3
51	1 : 80	—	71	63
53	1 : 80	—	59	72
54	0	1 : 10	86	87
56	0	1 : 20	20	20
58	0	1 : 20	45	65
59	1 : 10	—	43	65

— = not tested

negative animals 5, 17, 27, 36, 45, 47, 54, 56 and 58, which show phagocytosis also, in fact, possess agglutinins in low concentration in their serum. On the other hand, animals 22 and 30 which showed no phagocytosis have no agglutinins in their sera as judged by the agglutination test and showed no microscopic clumping of the bacilli used in the phagocytosis test.

It seemed, then, that the phagocytosis test was merely a more delicate means of determining the presence of antibody than was the agglutination test. The following experiments were therefore conducted to establish or refute this suggestion.

Experiment 3.

Citrated blood was collected from one animal (No. 5) which was negative to the agglutination test as usually read, *i.e.*, at 24 hours, but showed phagocytosis, and from another animal (No. 22) which was negative to the agglutination test and showed no phagocytosis.

An ordinary phagocytosis test was performed with these two samples and serum was tested for the presence of agglutinins. The serum in each case was negative to the agglutination test after 24 hours' incubation.

A portion of each blood sample was centrifuged, until the cells occupied a volume of approximately half the total original blood, and plasma collected. The cell deposits were washed twice with large volumes of saline and finally packed in the centrifuge so as to occupy again a volume approximately equal to half the original volume of uncentrifuged blood. Blood was reformed by mixing 0·5 c.c. cell deposit with 0·5 c.c. plasma. In this way cells from heifer 5 were mixed with plasma from heifer 22 and *vice-versa*. Controls of the centrifuging technique consisted of reformed mixtures of cells with their own plasma. 0·5 c.c. of the various "bloods" were then mixed with 0·5 c.c. amounts of a suspension of a virulent strain of *Br. abortus* standardised to 15 times tube 1 of the Brown scale and tested in the usual way for phagocytosis, 100 polynuclears being examined in each smear. The results are shown in Table III.

It may be seen that in a mixture of cells and plasma from heifer 5, 89 per cent. of the polynuclears show phagocytosis, and that in a similar mixture from heifer 22 none of the polynuclears show phagocytosis; these results are in agreement with the ordinary test, which gives 78 and 0 per cent. phagocytosis respectively, and show that the technique is not inhibitory to phagocytosis. In a mixture of cells from heifer 5 and plasma from heifer 22 there is no phagocytosis; whereas, in the converse mixture of cells from heifer 22 and plasma from heifer 5, 94 per cent. of the polynuclears show phagocytosis.

Table III

Demonstrating that phagocytosis is dependent on the presence of specific somatic antibody

Cells from Heifer No.	Plasma from Heifer No.	How treated.	Percentage of polynuclears showing phagocytosis.
5	5	—	78
16	16	—	65
22	22	—	0
5	5	Cells washed	89
5	22	" "	0
22	22	" "	0
22	5	" "	94
5 & 16	5	Plasma abs. *c Br. abortus* living	0
5 & 16	5	Plasma abs. *c Br. abortus* dead	0
5 & 16	5	Plasma abs. *c coli*	91
5 & 16	16	Plasma abs. *c Br. abortus* living	70
5 & 16	16	Plasma abs. *c Br. abortus* dead	83
5 & 16	16	Plasma abs. *c coli*	90

This experiment shows that the plasma, presumably containing an antibody, is the determining factor and not the cells, a result which was, of course, to be expected.

Experiment 4.

The next points to be determined were to find out (*a*) if a specific antibody was involved and (*b*) if this was ordinary somatic antibody. For this purpose plasma and cells were collected as above from one animal (No. 5) negative to the agglutination test but showing phagocytosis and from another (No. 16) positive to both tests; this latter animal had an agglutinin titre of 1:80. In this case, to avoid any possible individual cellular peculiarities, the cells were mixed.

The plasma from each animal was absorbed with living *Br. abortus*, dead *Br. abortus* and dead *Bact. coli*. The absorbing suspensions were not very dense and it was considered unlikely therefore, as in fact was the case, that they would appreciably affect any plasma with a relatively high concentration of antibody. The living suspension was prepared from a two-day growth on liver agar. The dead suspensions were similarly prepared but were boiled for ten minutes prior to their use. 1·0 c.c. amounts of these suspensions were centrifuged hard and the supernatant liquids discarded. The deposit was then thoroughly mixed up with 0·5 c.c. plasma and incubated at 37° C. for 40 minutes. The mixtures were then centrifuged again and the absorbed plasma mixed with washed blood cells as before and tested for phagocytosis in the usual way.

The results shown in Table III are quite clear cut. Absorption of plasma 5 with both living and dead *Br. abortus* removed all antibody and the polynuclears show no phagocytosis. Absorption of this plasma with the antigenically unrelated organism, *Bact. coli*, leaves antibody untouched, with the result that 91 per cent. of the polynuclears show phagocytosis. Absorption of plasma 16 was clearly insufficient and since, as is already evident, if traces of antibody remain a high degree of phagocytosis may be expected, it is not surprising to find that a light absorption had little effect on this plasma.

Experiment 5.

As a matter of interest it was decided to test samples for phagocytosis against a virulent and a non-virulent strain of *Br. abortus*. The virulent strain (544) was originally isolated from a bovine foetus and has been kept dried for many months without any loss of virulence. The non-virulent strain (45) was that used by McEwen (1937, McEwen and Roberts, 1936, McEwen and Priestley, 1938) in his vaccination studies; it is antigenically smooth (see McEwen and Priestley, 1938) and heat-stable as judged by the technique of Pandit and Wilson (1932).

The results are shown in Table II. It may be noted that on the whole there is more phagocytosis of the virulent strain than of the non-virulent strain, a finding which is, perhaps a little surprising. Individually the differences are generally not more than might be expected by chance, but collectively they are more than could reasonably be expected to have arisen in this way. In the light of experiment 1 it might be concluded that the differences could be accounted for by a difference in the density of the two suspensions. Although these suspensions were both carefully standardised to a density equivalent to 15 times tube 1 of the Brown scale it is quite possible that a slight difference existed. Moreover if one strain consisted of relatively large bacillary forms while the other was made up of cocco-bacilli, the densities might be the same yet there might be an appreciable difference in the numbers of bacteria per c.c.

It may at any rate reasonably be said that the polynuclear cells in these samples did not phagocytose the non-virulent strain *more* readily than they did the virulent strain.

This observation in no way conflicts with that of Munger and Huddleson (1937) who showed that heat- and dye-agglutinable strains of Brucella are more readily phagocytosed than stable strains, since they made no mention of virulence in their publication. Huddleson, Johnson and Hamann (1933) have in fact stated that, at least for human blood samples, it is immaterial whether virulent or non-virulent strains are used—assuming, presumably, that they are thermostable (see also Munger, Huddleson and Wakeman, 1937).

Discussion

These results make it abundantly clear that the so-called opsono-cytophagic test is merely a delicate test for the presence or absence of somatic antibody. It is to be presumed that a more delicate agglutination test than is at present generally used in this country would serve the same purpose. The fact that there is no obvious linear relation between the number of polynuclears showing phagocytosis and agglutinin titre is not surprising in view of the results shown in Table I. Examination of smears reveals marked clumping of the bacteria in those samples taken from animals positive to the agglutination test. Clearly, such clumping has the same effect as reducing the concentration of the suspension. Other things being equal, there should, in fact, be an inverse ratio between phagocytosis and agglutinin titre. That the other things are not equal, however, is made clear on examination of a few smears;

the degree and rate of clumping are not necessarily the same in two samples from animals showing the same concentration of agglutinins in their sera. Such factors as salt concentration, *p*H, etc., must all exert their effects and these will be mirrored in the phagocytosis test.

This conclusion makes it unlikely that the test can differentiate between susceptible and resistant animals, since there is little evidence that resistance is related entirely to somatic antibody. The available evidence in fact is rather opposed to this idea.

The writer agrees that infected animals and animals rendered resistant by suitable inoculation of a *live* vaccine may, and in fact generally do, show phagocytosis, while non-infected susceptible animals show little or no phagocytosis. But it is to be assumed that animals ineffectively vaccinated, *e.g.*, with one dose of a dead vaccine, or animals passively "immunised" and presumably not resistant, would also show phagocytosis if, as is claimed here, the opsonin or bacteriotropin concerned is ordinary somatic antibody.

All this is not to say that opsonin plays no part in immunity. In our present state of knowledge that would be an unwise statement. But it *is* to say that opsonin is probably not the only factor concerned in immunity.

In this connection one further point may be made. If animals show opsonin in their blood as a result of a previous artificial or natural inoculation with *Br. abortus*, which in addition to causing the production of somatic antibody also results in some immunity response about which we know very little at the moment, then it is clear that animals showing opsonin might be more immune than those showing no opsonin and that the presence or absence of this antibody could be regarded as a test for resistance or susceptibility. However, it is clear from what has been said above that this test could not *consistently* differentiate between resistant and susceptible animals and, in any case, an agglutination test would serve just as well.

SUMMARY

In the so-called opsono-cytophagic test to determine the degree of phagocytosis of *Br. abortus* by polymorphonuclear leucocytes it has been shown that more consistent results are obtained by using relatively dense suspensions than relatively thin ones.

Further, it has been shown that phagocytosis is dependent on the presence of somatic antibody.

Evidence is produced that non-virulent S strains of *Br. abortus* are not phagocytosed more readily than virulent S strains.

These results have been discussed and reasons brought forward for criticising the belief that a differentiation of resistant and susceptble animals can consistently be made by this means.

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MEDICAL MEN AND "SAFE" MILK

Medical speakers at a conference recently held in Edinburgh expressed the view that pasteurisation of milk was not enough to make milk-drinking "safe." The ultimate aim, they said, must be to eradicate tuberculosis from every herd.

Dr. J. D. Comrie, of the Scottish office of the British Medical Association, said that the boiling of milk effectually killed the tubercle baccilli, but it had the disadvantage that children, especially, found the milk unpalatable, and that some the valuable nutritional qualities of the milk were impaired. It was not necessary, however, absolutely to boil the milk, and its original taste and other qualities might be preserved if it were treated in the way originally recommended by Pasteur.

Pasteurised milk might be regarded as safe, with certain reservations. While, however, admitting that pasteurisation was good, so far as it went, the medical profession thought that the ideal to aim at should be to eradicate tuberculosis from the cows that supplied the milk.

Dr. W. G. Clark, Medical Officer of Health for Edinburgh, said that milk produced from a healthy animal under hygienic conditions was one of the most important articles of diet. Medical men felt that milk could ultimately be produced from healthy animals in a hygienic manner, and the method of distribution should be such that the risk of infection be reduced to the minimum.

Ten Years of Development in the Animal Industry of Palestine

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Introduction

This report covers the period 1927 to 1937 and seeks to present, in the space of a few paragraphs, a composite picture of the phenomenal development of Palestine's livestock industry during the last decade. A secondary, though more specific, object is to place on record the many-sided activities of the Government Veterinary Service, and to elucidate the comprehensive improvement programme, to the strenuous execution of which the remarkable progress achieved in the livestock industry is very largely due.

The Condition of the Animal Industry in 1927

Although during the War much of the best stock in the country had been slaughtered for food, at the time of the British occupation of Palestine in 1918 it was evident that stock-breeding and veterinary matters had received but little attention under the Ottoman regime. The country remained under the Occupied Enemy Territory Administration for two years, and it was not until the advent of Civil Administration in 1920 that the Veterinary Service of the Department of Agriculture and Fisheries came into being. When it did so, it was confronted by a multitude of problems.

The fellahin (peasants) of Palestine are fair agriculturists, but very poor stockmen. The earlier Jewish settlers had devoted most of their energies to cereal culture, and only in the few German Colonies was any attempt made to practise improved stock husbandry. The existing cattle, sheep and goats were scarcely worthy of the name, diseases were rife, and such was the standard of animal husbandry that no control of breeding was exercised, and only rarely was any special provision made for the feeding and housing of the stock. Some appreciation of the position may be gained from the following statements which appeared in a report by the Director of Agriculture and Fisheries published in 1922:—

> "The standard of dairy and beef cattle, woolled sheep, horses, mules and donkeys, is such as to render these useless as the basis of a modern system of management. There are not more than 500 cows in the country which could return a profit in milk and cream for generous feeding: protracted maturity and poor fattening qualities render the Arab steer a wretchedly unprofitable subject for fattening and finishing: our sheep produce wool which is only fit for carpet-making, and it is impossible to purchase local horses or mules for police or gendarmerie service. Even donkeys for departmental services must be imported from Cyprus and Syria. Pedigree and registered dairy stock are limited to less than two dozen animals, and it is significant that unregistered cows imported from Damascus normally sell for twice to three times the price of local cattle. . . ."

On the subject of feeding:—

> "It is noteworthy in this connection that hay, roots, silage and bedding are equally unobtainable in Palestine, and that, in the absence of any Government farm, our plans for stud work necessarily included the importation of grass, oat, and lucerne-hay, bran, cake and peat-moss."

Such was the condition of the livestock industry in 1922; and although, for the next five years, the Veterinary Service was of necessity mainly concerned with the eradication of disease, it was also during this period that the foundations of the future livestock improvement policy were laid. In the matter of disease control, the Service was organised and necessary legislation enacted to suppress and eradicate anthrax, foot-and-mouth disease, contagious abortion and piroplasmosis in cattle; variola, haemorrhagic septicaemia and pleuropneumonia in sheep and goats; mange, glanders and epizoötic lymphangitis in horse kind, and many other diseases, the ravages of which had hitherto been a serious limiting factor to development. The rapidity with which, in 1926, a widespread outbreak of cattle plague was brought under control, bears testimony to the efficiency of this skeleton veterinary organisation. Infection was attributed to an epidemic in the Damascus area, of which no report was received in time to permit of precautionary measures being taken. The disease spread rapidly through 39 villages, in which more than 8,000 animals were exposed to infection. Thanks to a vigorous inoculation campaign, the loss was only 4 per cent., and it was possible to declare the country free of plague within six weeks of the first outbreak.

Other disease control measures initiated by the Veterinary Service during the transition period were:—

(1) The establishment of a chain of animal quarantine stations at points of entry along the frontiers, and the appointment of veterinary guards to prevent the smuggling of animals across the borders.

(2) The development of a safe and sanitary milk supply for the larger towns.

(3) The opening up and regulation of an import trade in slaughter stock with Cyprus and Roumania.

(4) The inspection and regulation of slaughterhouses, markets and khans (stables).

(5) The inspection of imported hides, skins, and other animal products.

(6) A dipping campaign to control tick-borne diseases, and a drenching campaign to control stomach worms in sheep.

(7) The destruction of jackals and ownerless dogs in the interests of rabies control.

(8) The provision of veterinary attendance to police and gendarmerie animals.

(9) The establishment of a Government Veterinary Laboratory to undertake research work, routine diagnosis and the preparation of vaccines and sera.

In 1926 a first positive step towards the improvement of animal breeding was made in the establishment of a Stock Breeding Service and a Government Stock Farm and Poultry and Bee-keeping Station at Acre. Three pure-bred Arab stallions of different and famous desert strains were purchased from the Crabbet stud in England. Two large Catalonian jackasses for mule-breeding were obtained from Barcelona, together with three jackasses and three donkey-mares from Cyprus. One North and three South Devon pedigree bulls were also imported, as on account of their success in Cyprus, it was considered at the time that these breeds would be the most suitable for crossing with the local Arab cattle.

The first three years of the institution's existence were, however, characterised more by losses suffered rather than by the progress made. The Arab horses contracted dourine, as a result of which the stallions had to be castrated, and the infected mares were declared unfit for further breeding. Of the two Catalonian jackasses, one developed laminitis and was destroyed, while the other became infected with dourine, as did all the males of the Cyprian stock. The Devon bulls were found to be highly susceptible to tick fever and were in any case too large for breeding with the local cows. (The last of them is reported to have been sold for Christmas beef in 1929.) Specimen fleeces from crosses with Mersisi sheep, which had been imported from Egypt to improve wool-quality, were the subject of an unfavourable report by the Imperial Institute; while introduction of Zeraibi and Anglo-Nubian goats was found to be equally unsatisfactory. It was obvious that if the scheme was to continue in operation, there would have to be in future a definite policy, which would be based on a careful study of local conditions. In June, 1931, with this object in view, the Stock Breeding, Poultry and Bee-keeping branches were incorporated in the Veterinary Service and placed under the administrative control of the Chief Veterinary Officer. At the same time a change in the management of the Acre station was effected.

The Policy of Improvement

The new policy is directed along three main lines, namely (1) breeding, (2) feeding and (3) management.

Breeding.

With regard to breeding, the farm was first restocked with cattle, horses, donkeys, sheep, goats, pigs and poultry of breeds which, since they were suited to local needs and conditions, soon became popular both with the Jewish colonists and with the Arab peasantry.

(1) *Cattle.*—In the case of cattle, selection work among the native stock is carried on, but crossing with introduced breeds such as the Lebanese and Kerry, constitutes the main line of work. Boaz cattle were imported from Turkey for crossing on the local breeds to produce a suitable working oxen for the hill districts. The improved dairy cattle kept by the Jewish colonists are mainly of the Friesian type, and crossing with the Guernsey breed is now being carried out with the object of augmenting butter-fat production in the cross-bred strain.

(2) *Horses, Mules and Donkeys.*—A new stud of Arab horses has been built up with a view to the maintenance and improvement of the Arab blood in the country. West Highland Pony stallions were imported and crossed on village mares of the Arab type with the object of producing a stronger animal for agricultural work. The mares of this cross, when served by a jackass, should produce a satisfactory type of mule. Herds of pure-bred Cyprian and Damascus donkeys are maintained, and jackasses of these breeds play a part in the improvement of local donkey stock.

(3) *Sheep and Goats.*—In the case of sheep, the work is concentrated on improving the milk yield of the local or Awasi breed by selection. A cross-breeding experiment with imported pure-bred Karakul rams, which has as its object the introduction of an additional source of income in the form of "Persian" lamb skins, is showing very considerable promise.

In the case of goats, a herd of the Mamber or Syrian breed is maintained since, while still retaining the characteristics of hardiness, this breed gives a better milk yield than the local mountain goat. In order to meet the requirements of goat-keepers in the neighbourhood of towns, a more delicate dairy breed of goat originating in Damascus, has been made the subject of milk-recording and selection work.

(4) *Pigs.*—Pigs of the Large White and Middle White breeds have been satisfactorily acclimatised and there is a good demand for breeding stock from pig-breeders among the German and Christian Arab sections of the population.

(5) *Poultry, Rabbits and Bees.*—The improvement policy with regard to poultry is two-fold. Firstly, selected pedigree stock and hatching eggs of several pure breeds are sold to farmers at nominal prices; and secondly, cockerels of the heavy breeds are distributed free of charge to villagers in order to grade up the local fowls.

The pure breeds maintained are as follows:—

Light Breeds.	*Heavy Breeds.*
White Leghorn.	White Wyandotte.
Black Leghorn.	Rhode Island Red.
Faiyoumi (Egyptian).	Light-Sussex.
	Australorp.
	Barred Plymouth Rock.

All imported birds are of famous pedigree strains, and are individually selected and egg-recorded. In addition, the mixed local breed of fowl (Baladi) is being separated into a number of distinct strains, in each of which selection is being made for egg-production.

The raising of ducks and turkeys is being encouraged, and four breeds of ducks and one of turkeys have been introduced.

Considerable attention is being paid to rabbit-keeping for the production of meat, fur, and wool. For meat production the most popular breeds are the Chinchilla and the White Giant; for fur production there are five varieties of Rex, and for wool there is the Angora.

A very satisfactory achievement has been recorded in the introduction and development of modern bee-keeping. This development has been encouraged by Government distribution of bee-swarms, the sale of modern hives and equipment on hire-purchase terms, the issue of duty-free sugar for feeding, and the provision of demonstration stations, technical instruction and advice. The local bee-stock is being improved and the nectar gathering efficiency increased by the introduction of Italian and Carniolan queens.

(6) *Extension.*—The stock-breeding improvement service is extended to the public through various channels:—

(*a*) Animals brought to the stock farm are served free of charge, and selected sires are distributed and stand at stud in all districts throughout the breeding season.

(*b*) High-class stud animals are issued on loan to a large number of villages, and in the case of very poor districts their forage is occasionally supplied free of charge during the first year or two.

(*c*) Selected sires of all classes of stock are sold to *bona fide* breeders at nominal prices.

(*d*) Schemes are in operation in the case of bulls and jackasses under which a sire is selected in each village and the remaining male stock is castrated. The owner of the selected sire undertakes to arrange for the service of all animals in his village, in return for which he receives a cash premium.

(*e*) In connection with the improvement of poultry husbandry, large numbers of hatching eggs, day-old chicks, and three-months-old birds are sold to breeders at nominal prices.

(*f*) Bee-keeping is similarly encouraged by the sale of swarms and selected queens.

(7) *Development.*—Some idea of the development of the stock-breeding and poultry improvement services during the period 1927 to 1937 may be gained from the following statistics:—

	1927.	1937.
(*a*) *Livestock.*		
(i) Establishment of the Government Farm	68	1,083
(ii) Issues of animals for breeding purposes	—	304
(iii) Number of services performed by Government sires	120	3,960
(*b*) *Poultry and Bees.*		
(i) Establishment at Government Stations	200	6,000
(ii) Distribution of stock	320	15,884
(iii) Distribution of hatching eggs ...	3,840	56,709
(iv) Distribution of bee swarms ...	—	457

FEEDING.

It has already been mentioned that as recently as 1922 the fellahin made no attempt to provide food and breeding for their animals. Indeed it was only with difficulty that they were convinced of the necessity for doing so, and with even greater difficulty that the required provision could be made. The problem of improving animal nutrition in the hill districts is particularly complicated because the available area of level land is in many cases insufficient to provide the foodstuff requirements of the farmers themselves, and in any case, fodder crops cannot be grown without irrigation, and no supply of irrigation water is available.

In these circumstances domestic animals must continue to derive their nourishment from the natural products of the hillsides, and the standard of nutrition can be raised only in so far as the production and utilisation of the drought-resistant natural vegetation can be improved. To this end the hillsides have been enclosed in several parts of the country in order

to prevent over-grazing, and to encourage controlled rotational grazing. The planting of carob trees is being encouraged, since these provide a fruit (the locust bean) which is a valuable stock food. Similarly, experiments are being made on the possibility of using spineless cactus as a stock food during periods of drought, and several drought-resistant species of grasses and clovers have been introduced and their value as pasture plants is being investigated.

On the other hand, in the modern Jewish colonies, which are situated mostly in the irrigable plains, animal nutrition has, in the space of ten years, attained a standard comparable with that of Western Europe. Green fodder, such as lucerne, Egyptian clover and maize has been introduced, and abundant crops are grown under irrigation; while imported concentrates are used to balance the ration. The preparation of silage has been adopted and large areas of oat and vetch are grown for hay. In short, a high standard of animal nutrition has been attained, and this development paid well all the time that the demand for animal products as foodstuffs exceeded the available local supply. With increased production during recent years, however, the domestic market has become saturated, prices have fallen, and the problem of the economical maintenance of the high standard of animal nutrition remains to be solved.

Management.

Improvements in the methods of management of all classes of stock are made the object of an energetic propaganda. The provision of adequate housing during the winter, and of shade, water and protection from flies during the summer, a logical programme of breeding operations and the control of pests and diseases by such methods as dipping and drenching, are some of the many subjects dealt with. Propaganda is conducted in the form of radio talks, articles to the Press, an annual Farmer's Day at the Acre station, livestock shows, dipping demonstrations, etc. In addition, the Service seeks to encourage animal husbandry by issuing free of charge the poultry, rabbits and bees required for demonstrational purposes in school gardens, and by admitting some 50 students a year to courses of practical training in stock husbandry.

The Resulting Development, 1927–1937

(*a*) *Cattle.*—The total number of cattle increased from 120,000 to 170,000. The number of improved dairy cows (mostly in Jewish settlements) increased from 2,000 to 10,000. The total annual milk production increased from 4,000,000 to 42,000,000 litres. The average annual milk yield of the improved cows was raised from 1,400 to 3,500 litres. The wholesale price of Jewish milk fell from 20 to 11 mils per litre.

(*b*) *Horses, Mules and Donkeys.* — The number of horses increased from 11,000 to 20,000, of mules from 5,000 to 9,000 and of donkeys from 70,000 to 92,000. Apart from the increase in numbers, there was a very real improvement in the quality of the equine stock, due mostly to the introduction and breeding of improved working horses and mules in the Jewish settlements.

(*c*) *Sheep and Goats.*—The number of sheep declined from 290,000 to 209,000, and the number of goats from 570,000 to 360,000. In spite of the marked decrease in numbers, the estimated total milk production remained approximately 42,000,000 litres. The increase in average milk production has been mainly due to the change from the extensive to the intensive system of management, the provision of better feeding, and the improvement of the breeds by selection and crossing. The number of sheep and goats in Jewish settlements has increased from 700 to 13,000. The average milk yield of Awasi ewes kept in such settlements has risen from 40 to 80 litres per year as the result of selection work and improvements in feeding practice.

(*d*) *Pigs.*—The number of pigs increased from a few to 2,000 head. The preponderant breed has been changed from the native razor-backed pig to selected animals of the Large White–Middle White cross. Pig-raising is carried on only by the German and Christian Arab sections of the population. The demand for fresh pork has risen coincident with the increase of the British and Christian Arab population. There is still a very considerable field for development.

(*e*) *Poultry and Bees.*—The number of laying stock has increased from 750,000 to 2,700,000. The total annual egg production has risen from 30,000,000 to 108,000,000. The production of table poultry has risen from a few thousands to 2,000,000. In the Jewish colonies a modern and progressive poultry industry has developed. The main object is intensive egg production, and the breed kept is the White Leghorn. Complex balanced rations are fed, and the very latest methods of incubation, rearing and management are adopted. There is still room for a very considerable development since the consumption of eggs still exceeds the local production by 93,000,000. The industry is, however, largely dependent upon imported foodstuffs, and this renders difficult competition with exporting countries, in which the birds are kept under range conditions and little or no expenditure on foodstuffs is incurred.

The number of modern bee-keepers has

increased from less than 100 to 620, and the number of populated hives from 4,000 to 27,000. Honey production has increased from 40 to 275 tons per annum. The fellahin have changed from primitive to modern methods of bee-keeping.

Conclusion

The total number of livestock in the country (including poultry, but excluding camels and buffaloes) has increased from 1,800,000 to 3,600,000 in a period of ten years. The approximate value of the country's stock has increased from £P. 1,800,000 to £P. 2,700,000, and the approximate annual value of animal products from £P. 700,000 to £P. 1,700,000. Altogether, a very remarkable achievement.

THE LATE PROFESSOR GRAM

Christian Gram, who died on November 14th, was born in 1853 and made his first important contribution to medicine in Denmark in 1884, when he described that system of bacteriological staining which has ever since been associated with his name. His first scientific publications dealt with the number and size of the blood corpuscles. He was, however, interested in clinical problems, and one of his studies in this field concerned the clinical reactions of theobromine. In 1891 he was appointed professor of pharmacology, and in the following year he assumed the duties of senior physician to the Frederik Hospital, Copenhagen. In 1900 he was appointed a professor of medicine, and he did not retire from his hospital and professorial appointments till 1923.

* * * * *

LITTER TESTING

At a recent meeting of the Council of the National Pig Breeders Association, the President (Sir Wyndham Knight) reported on the meeting with the Bacon Development Board to discuss the establishment of litter testing stations. The Board had issued the draft conditions governing the working of the stations. The N.P.B.A. had pressed for the stations to be used for pedigree pigs only, as experience suggested that the object of litter testing was to find out useful information about strains *within breeds*. To test crosses which could not be repeated seemed unnecessary. The Association had secured opinions from the highest authorities, and in all cases they confirmed this view. However, although the stations were apparently to be open for first-crosses, preference would be given to pure-bred entries (all breeds) and the Board could rely upon the N.P.B.A.'s active interest.

* * * * *

The British Dairy Farmers' Association have arranged a tour in Holland next year for four days from June 17th. Next year's B.D.F.A. show will be held at Earl's Court from September 26th to 29th.

RECENT RESEARCH ON THE INFLUENCE OF FOOD ON THE CAUSATION OF DISEASE*

F. ZARIBNICKY

The diseases of domestic animals caused by feeding fall clearly into the following groups:—

1. Allergic diseases.
2. Avitaminoses.
3. Disturbances of the acid-base equilibrium and of mineral metabolism.
4. Infections.
5. Intoxications.
6. Photosensitivity.

1. The diseases of the various domestic animals, especially pigs, previously described in the literature as "feeding rash" or "exanthema," are to-day regarded as allergic reactions. They can be set up by various feeding stuffs or by a particular constituent of the food and it remains for further research to find some objective means (by skin or intradermal tests) of recognising the allergic state. Further, the possibility of desensitisation must be clarified after investigation of the causes which produce an allergic state—as, for example, a super-imposed infection. It must also be determined whether certain foodstuffs or their constituents, when fed to pregnant animals, produce a reaction which predisposes the offspring to allergic diseases. Also, it has yet to be established whether other organs or groups of organs can be affected as well as the skin.

2. So much work has been done on the question of avitaminosis that the importance of vitamins or groups of vitamins for domestic animals is generally known. The work shows that as a protection against avitaminosis there is no objection in feeding food rich in vitamins but on the appearance of definite symptoms of avitaminosis, synthetic vitamin preparations should first be given. The difficulty is that the synergic and antagonistic actions of particular vitamins are not yet known with certainty, nor the optimum doses, nor whether avitaminosis is produced as a result of a lack of the substance in the food or an incapacity on the part of the animal to utilise the vitamins present. Avitaminosis is most frequently observed after feeding industrial products which are either deficient or entirely lacking in vitamins—for example, meat meal or products which become more or less exhausted of vitamins as a result of the

*Paper presented to the Thirteenth International Veterinary Congress, Zurich-Interlaken, August, 1938.

previous manufacturing processes, *e.g.*, rape cake and pulps of various kinds. In this case, supplementary feeding with food rich in vitamins readily restores the balance. The observation may be made that of the fat soluble vitamins A and D, the former—which occurs in various plants, *e.g.*, *Daucus carota*, *Urtica dioica*, etc., as the active provitamin β-carotin—is always available for animals; the latter, which in oily solution is not readily absorbed by ruminants, is contained in the husk of cocoa and is obtained in adequate amounts as a by-product on the manufacture of the seeds of *Theobroma cocoa* and also irradiated yeast. Of the water-soluble vitamins B_1 to B_6 and vitamin C, the former are found in adequate amounts in dried yeast and the latter in good quality green food such as clover hay. It should, therefore, be possible to prevent the onset of avitaminosis by feeding suitable fodder.

3. Disturbance of the acid-base equilibrium by foodstuffs which in one sense are regarded as being extremely acidifying, has been studied chiefly by determining the alkaline alkalinity and the alkaline-earth alkalinity of the individual food mixtures. The value of the acid and base radicals is expressed in mg. equivalent weight per 100 grm. dry weight of food and is said to be positive when the base radicals are in excess and negative when the acid radicals are in excess. By a suitable adjustment of the food, it is easy to correct the calculated discrepancy. The work of A. S. Solun and M. Schuster has shown that the maintenance of the acid-base equilibrium of chicken food is important for satisfactory feeding. They also showed that the total ammonia in the faeces and the chloride content of the erythrocytes gives an indication of the state of affairs in the body. With regard to mineral metabolism, the value of licks of special composition has been proved. They permit the animal to vary the intake of the inorganic substances provided, according to its individual requirements.

The work of A. Solun and A. Arsenjew shows that excess of minerals may be injurious, especially for hens in which a peculiar nutritional disease, nutritional paralysis, can be set up. It is characterised by enlargement of the hocks, paralysis of the feet and slipped tendons. The ash content of the food was controlled in their experiments.

4. Infections arising from food contaminated with pathological bacteria are extensively dealt with in the literature. It may be mentioned here that H. David has isolated bacteria of the paratyphus-enteritis group from brewer's grains, so that the possibility of the occurrence of disease as a result of feeding such industrial by-products must be borne in mind.

5. With regard to intoxications, the greatest interest is centred in specific organic or inorganic poisons which occur in the food itself. On the other hand, it has been recorded that a severe intoxication can follow the ingestion of such a food as cod-liver oil. In this case, various degrees of liver dystrophia have been observed in pigs; in cattle, stiffness of the extremities and atrophy of the skeletal muscles. Recent American research indicates that it is the unsaponifiable part of the cod-liver oil which is responsible for producing the deleterious effects. However, the aetiology of nutritive muscle dystrophia is not yet fully established. Guinea-pigs and rabbits have been found to be the most suitable animals for research into this disease; sheep are less suitable and albino rats are unsuitable, but goats may be used.

The clinical picture of the disease, its course and pathology, and the physiological and chemical changes in the muscle, blood and urine have been determined by animal experiment, but the aetiology has not yet been clearly explained. It appears that the vitamin content of the food has some influence on the onset and course of the disease.

The work of M. Popp and J. Contzen with barley scab (*Fusarium roseum* Giberella) has clearly shown that diseases which are produced by phyto-parasites in the food are caused mainly by the action of the parasite on the proteins. In the case of barley the so-called barley toxalbumin is produced which causes severe illness in pigs and the death of experimental animals, whilst horses refuse to eat contaminated barley; cattle, however, eat it readily. The observations of these workers do not appear to support the opinion of various authors who suggest that the ill-effects after eating food contaminated with phyto-parasites and moulds are not due to the specific action of the parasites nor to their action on the food but to substances liberated from the parasites themselves when they are broken down in the alimentary canal. In the case of barley scab, however, toxalbumins have been established as the agents which cause poisoning.

6. With the exception of Phagopyrum (*Phagopyrum escalentum*) and Hypericum (*Hypericum perforatum*) which are well-known constituents of food possessing photodynamic action, substances with a similar action are not known to any great extent.

Summary

1. The author gives a general review of feed diseases observed in domestic animals.

2. He recommends classifying the affections according to their causes in order to facilitate their study.

[Trans.: J. A. Nicholson.]

The Veterinary Record

December 31st, 1938

The Loveday Report and After

FOR many weeks now we have been publishing editorial comment upon the recently issued Report on Veterinary Education in Great Britain. Such a task as the analysis and appraisement of a Report of this importance to the veterinary profession in this country was not to be undertaken lightly by the journal of the National Veterinary Medical Association, nor was it a duty which its editorial committee could avoid, or even delay. The profession naturally looked for an early expression of opinion from the Committee charged by the Association with the conduct of its journal upon the recommendations and text of a report so vital to the future of the profession. The editorial committee is a representative body of 18 members, hence the primary duty of surveying the report and outlining the method of presentation of the criticism was originally entrusted to a sub-committee, but each member of the full committee has carefully considered the Report and discussed at great length every editorial article we have published. If these articles seem to have given general support to the recommendations of the Loveday Committee it is because we are convinced, after the most careful study, that such support is to the definite advantage of the profession. Where we have differed from the recommendations we have not hesitated to express our view. As a committee we have striven to assess the Report in a spirit of detachment and cool judgment, endeavouring to envisage the results which can be expected to ensue from the adoption of the recommendations, and to assess their effects, not solely upon this or that institution more directly affected than ourselves, but upon the profession as a whole.

Now that this preliminary duty is, at least for the moment, at an end, we may well ask what may be expected to follow the Report. Up to the present only one body directly affected by the recommendations has announced its view and that body has, we think unfortunately, rejected those recommendations more specifically affecting itself. The individual veterinary schools, the universities and the Government have made no pronouncement up to the present, although we are fully aware that each of them is considering the Report most carefully. The Council of the "National" and many of its divisions are also giving it their earnest consideration and three of the latter have already expressed their agreement with the recommendations in general.

These facts show that the profession and others are giving the Report very careful consideration but they do not indicate any direct move towards the achievement of the improvements which are recommended. Presumably, as the Committee was appointed "in particular to make recommendations as to the provision which should be made from public funds in the five years 1937-42 in aid of the maintenance expenses of institutions providing veterinary education" we may reasonably expect the early acceptance by the Government of the recommendations for recurrent grants. Before the Government announces its acceptance of the other recommendations, however, it will presumably seek the views of all interested bodies thereon. This will inevitably lead to some delay before the necessary legislation outlined by the Loveday Committee can be introduced into Parliament. Meanwhile the other bodies concerned need not delay the exchange of views, but should act upon the recommendation of the Committee, that "the R.C.V.S., the Universities and the Veterinary Schools should consult together at an early date with a view to the elaboration of a scheme for carrying into effect such of these recommendations as require agreement and joint action"; the schools should consult with their local universities, and school should consult school, as no doubt university is consulting with university. The Committee actually recommends that "the Government should initiate such legislation as may be necessary to give effect to these recommendations," and it is evident that, particularly as a fairly large sum of money is concerned with the adoption of the recommendations, the need for co-operative action upon the part of those vitally concerned is of paramount importance. In this task the "National" would seem to have a peculiarly important position as representing the profession as a whole, and therefore possessing a wide and independent view. It is plainly its duty, in the interests of the profession, to strive for agreement by all parties concerned. It is certain that in the face of a united acceptance of the major recommendations of

ANNOTATION

The Relation of Capillary Fragility to the Purpuras

The clinical syndrome of purpura has been known for many years, and it has long been recognised to occur in association with certain diseases. These associated diseases are so numerous that the purpuras have been classified according to their accompanying disease (Whitby and Britton, 1937). These complexities of classification are in themselves an indication that the underlying pathology and aetiology of the purpuras are not clear.

However, capillary fragility and the number of blood platelets are known to be factors that may be involved in certain types of purpura. Strictly speaking, purpura is only a symptom, and idiopathic thrombocytopenic purpura in man is the only type of purpura that may be regarded as a disease entity *per se*. The reason it may be so regarded is that it usually occurs unaccompanied by any other diseased condition.

In idiopathic thrombocytopenic purpura there is a diminution in the number of blood platelets and a decrease in capillary resistance. Splenectomy frequently results in improvement. It is argued that removal of the spleen either stops that organ from destroying blood platelets in excess, or removes some inhibitory factor acting on the production of blood platelets from the megakaryocytes in the bone marrow. At any rate the deficiency of blood platelets appears to be the important lesion in the disease.

On the other hand, there are a number of purpuras in which platelet deficiency is slight or absent, and the lesions are due to some capillary endothelial damage or weakness. Such purpuras occur in the late stages of acute fevers, as a manifestation of allergic reaction (Henoch-Schönlein syndrome), poisoning due to quinine, belladonna, snake venom, and in avitaminosis, including scurvy. While cases of idiopathic thrombocytopenic purpura do occur in animals the majority of the cases of purpura in animals appear to be associated with some acute fever, *e.g.*, purpura following strangles in the horse. Unfortunately little is known about the blood platelet levels in animals and technical difficulties preclude the use of capillary resistance tests. This being so, we are ignorant of the underlying deficiency in this type of purpura in animals.

The curative effect of ascorbic acid (vitamin C) in scurvy has been amply demonstrated, although it has no immediate effect on the haemorrhages that are a feature of the disease. Szent-Györgyi and Rusznyák (1936) have extracted a substance from lemon juice and Hungarian red pepper which they have called vitamin P. This substance had the effect of reducing capillary fragility in a number of purpuric conditions. Their clinical material included three cases of vascular purpura, four cases of thrombocytopenic purpura, seven cases of infectious disease, one case of myxoedema and two cases of diabetes mellitus. These extracts were effective whether the extravasations were of whole blood or plasma protein. Szent-Györgyi has postulated that ascorbic acid is accompanied in the cell by a substance of similar importance and related activity. In scurvy the symptoms due to lack of ascorbic acid may conceal a deficiency of this substance, vitamin P. The clinical trial was confirmed experimentally on two lots of guinea-pigs kept on a scorbutic diet (Bentsáth, Rusznyák and Szent-Györgyi, 1936). One lot of guinea-pigs received citrin (vitamin P), the other lot did not. Although both lots presented scorbutic symptoms, the incidence and the extent of the haemorrhages was much less in the lot receiving citrin.

Further work has shown that citrin consists of two flavonone glucosides, hesperidin and eriodictyol glucoside (Bruckner and Szent-Györgyi, 1933).

Scarborough and Stewart (1938) have tried the effect of hesperidin on six cases suffering from the deficiency of one or more vitamins in the diet. Three of the cases presented spontaneous haemorrhages following the administration of arsenic or bismuth (haemorrhagic capillary toxicosis of Frank), and three cases developed haemorrhages after testing the capillary resistance by the positive pressure method. The oral administration of 1 gm. of hesperidin per day appreciably reduced the number of haemorrhages. There is no mention of the blood platelet level in these patients.

Although the evidence in favour of vitamin P in the reduction of purpuric haemorrhages is impressive, Vaughan (1937) in a critical review of remedial measures in thrombocytopenic purpura has not found it of use in this disease.

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the Report no Government could consign it to those unending shelves which already contain such reports as those of the Prain Committee and the Lovat Committee. But most Governments need frequent stimulation, both from within and without Parliament. We have little doubt that the "National" will accept this as one of its duties and will begin its efforts to secure acceptance of the Report by those in authority at the earliest opportune moment, and will persist with this policy until the goal has been reached.

Szent-Györgyi (quoted from Vaughan, 1937) has also found it of little use in thrombocytopenic purpura.

Nevertheless a case seems to have been made out for the use of vitamin P in those purpuras where the underlying lesion is mainly one of a defective capillary resistance. An empirical trial of its use in the purpuras of animals associated with acute fevers might well yield results of therapeutic value.

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D. L. Hughes.

ABSTRACTS

[I.—Swine Influenza. Scott, J. P. (1938.) Thirteenth Int. Vet. Cong.; **II.—Die Ferkelgrippe.** Waldmann, O. (1938.) Thirteenth Int. Vet. Cong.]

The two diseases swine influenza and ferkelgrippe resemble each other very closely in their aetiology and pathogenesis, each being referable to a pneumotropic virus acting in association with a bacterium of the Haemophilus group. They differ, however, rather strikingly in their clinical manifestations and epizootiological characters.

Swine influenza as seen in America is an acute contagious disease of short duration affecting pigs of all ages. It is most prevalent in hogs six to ten months old. The condition shows a tendency to spread rapidly in an affected district with the result that within a short time large numbers of pigs appear extremely sick and show marked evidence of pulmonary involvement. As a rule the disease runs a rapid course and most of the herd returns to normal. The death rate is low, probably not more than 2 per cent.

Ferkelgrippe, however, which occurs in Germany and other parts of Europe, is an enzoötic disease which attacks pigs almost exclusively during the suckling period and runs a more chronic course than swine influenza. The onset of listlessness and impaired appetite is followed within one or two weeks by the development of a moist, painful cough which is a characteristic symptom. Losses during the suckling stage usually vary from 20 to 30 per cent., but may be as high as 80 per cent. in a considerable number of herds. Some of the survivors remain stunted and continue to cough for some time; they may improve after an illness of one or two months but retain the cough until they are fit for slaughter. Susceptibility decreases quickly with age but is still present to a slight degree at the twelfth week and in exceptional cases even later. Owing to its high mortality and its tendency to persist in a herd and infect successive litters of young pigs, ferkelgrippe is a much more serious condition, from an economic aspect, than swine influenza.

The characteristic lesions of the latter are atalectasis, especially of the cardiac and apical lobes, peribronchial pneumonia and bronchiolar catarrh. Changes almost identical with these are found in the early stages of ferkelgrippe, but from then onwards there is a marked divergence in the course of the two diseases. Whereas the lesions of swine influenza tend to early resolution, those of ferkelgrippe are prone to invasion by various types of secondary bacteria leading to more or less extensive broncho-pneumonia with the onset of necrosis and other complications of a fatal kind. It is true that similar complications may be observed in swine influenza but only in exceptional cases as, for example, in affected pigs subjected to severe exposure during transit. Scott records such an instance among pigs received at the Philadelphia stockyards in which *Pasteurella suiseptica* and other secondary organisms were present in addition to the virus.

According to Waldmann, American strains of virus are much more virulent than the European not only for the pig, but also for the white mouse, which is a very convenient experimental animal. Both types can be grown on the chorioallantoic membrane of the developing egg. The cultivated virus of swine influenza maintains its original virulence for many generations, but that of ferkelgrippe soon loses its infectivity for the mouse, though it retains its power to set up specific lesions in the pig. Experiment has shown that pigs which have recovered from ferkelgrippe, though still susceptible to swine influenza virus, are much less severely affected by it than normal animals used as controls.

[Further work will no doubt decide the exact relationship which exists between these two viruses.

Waldmann is of the opinion that it is essentially a question of degree of virulence which determines the differences in the clinical and epizootiological features of the diseases with which they are associated but it may well be that there are other factors underlying these differences which remain to be determined.]

A method which has proved of value in controlling the disease in infected herds in Germany is the use of separate farrowing pens and runs for individual sows and their litters in which the young pigs are kept until they are from eight to ten weeks of age. Such units are set up in the open and are separated from each other by a space of one-and-a-half metres.

T. J. B.

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[Leukosis in the Domestic Animals. (Trans. title.) Dobberstein, J., and Seifried, O. (1938.) Thirteenth Int. Vet. Cong. English summary.]

Leukaemia is a neoplastic proliferation of haemopoietic tissue. According to the type of cell that predominates, leukosis in animals may be described as myeloid, lymphadenoid, lymphosarcomatous or erythroblastic. Leukaemia occurs in all domestic animals, but cattle appear to be the most frequently affected. The aleukaemic form is the most common.

Bovine leukaemia is present in most countries of Europe and on the other continents. However, it appears to be less prevalent in mountainous countries such as Switzerland. The incidence of the disease is on the increase.

The possibility that the causal agent of the disease is infectious seems unlikely, although it cannot be ruled out. The lesions of chronic intoxication caused by various proteins are similar to those of leukaemia in cattle, and it is possible that such leukaemia may be the result of an intoxication of the same kind. It is not known whether environment, diet, individual idiosyncrasy, heredity and similar factors may also be involved. From their own experience the authors cannot say whether hereditary transmission is a factor in the spread of the disease, but transmission through the placenta has been demonstrated.

Bovine leukaemia usually attacks adult cattle between the ages of five and eight years, but it may also attack calves. Females are affected more often than males. The disease is usually chronic, the symptoms varying with the localisation and rapidity of the proliferation of the lesions and the degree of infiltration of the organs.

Three types of leukaemia may be distinguished, according to the degree of flooding of the circulating blood with abnormal white cells. These three types are known as leukaemic, sub-leukaemic and aleukaemic leukaemias. Anaemia may be present at the commencement of the disease. Leukaemic leukaemia in cattle may be lymphocytic or lymphoidocytic in type, although mixed types do occur. Coagulation time, the number of blood platelets, haemoglobin value and colour index show variations from the normal at the onset of the disease. The blood calcium level does not alter.

On *post-mortem* examination the lesions may be tumorous or take the form of diffuse infiltrations in various organs. Abnormal proliferation occurs in the lymphatic glands of all animals. The liver, mucous membrane of the alimentary tract and urogenital passages, the myocardium and sub-serous tissues are frequently the seat of lesions. The bone marrow and spleen are commonly affected, but the respiratory tract and the skin rarely present lesions.

The proliferating process appears to originate in the reticulo-endothelial cells of various organs.

In lymphadenosis, lymphatic tissue may the primary site of the process.

The disease is essentially an unrestricted production of abnormal white cells, closely analogous to the embryonic formation of white blood cells.

Bovine leukaemia bears a great resemblance to fowl leukaemia and haemocytoblastosis of the guinea-pig and the mouse.

D. L. H.

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[Investigation on Post-parturient Diseases of Metabolism, Acetonaemia and some other Cattle Diseases. Prophylaxis of the Diseases of Metabolism in the Cow. Meisters, N. (1938.) *Deuts. tierärztl. Wschr.* **21.** 321-328.]

The blood and urine of ten cases of acetonaemia have been examined. In many cases blood sugar was low (57 mg. per cent.). Acetone and *B* oxybutyric acid were increased in all cases, average figures being 18·1 and 71·7 mg. per cent. respectively, a corresponding increase also being found in the urine with a consequent fall in *p*H. The serum magnesium showed a tendency to rise while serum calcium, phosphate, sodium and potassium were unchanged.

Animal husbandry in relation to acetonaemia is discussed and the conclusion is drawn that feeding on large amounts of roughage with little concentrates together with lack of exercise are important factors in producing acetonaemia. It is recommended that cattle should be turned out to graze in the winter.

Figures of blood and urine examinations of a case of eclampsia and post-parturient dyspepsia are given.

A. T. P.

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[New Researches on some Helminthic Diseases of India. Datta, S. C. A. (1938.) Thirteenth Int. Vet. Cong. Heft 8. 78-90.]

Datta, in a survey of recent helminthological researches carried out in India, deals with *Schistosoma nasalis* causing bovine nasal granuloma, *S. indicum* causing liver lesions in debilitated equines and *Habronema muscae*

causing bursati in horses. The author considers equine Lichen tropicus to be a microfilarial pityriasis possibly connected with *Onchocerca* and the periodic ophthalmia of horses to be due to unsheathed larvae of possibly also *Onchocerca.* Reference is made to *Parafilaria multipapillosa* causing dourine-like plaques, to *Stephanofilaria assamensis* causing hump sore in cattle, and to a microfilarial dermatitis of cattle.

J. N. O.

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[Growth of Salmonella typhi and certain Other Members of the Salmonella group in Milk and Butter Stored at Atmosphere Temperatures. Pullinger, E. J., and Kemp, Audrey, E. (1938.) *Jour. Hyg.* **38.** 587-595.]

The question whether certain members of the genus *Salmonella* can multiply in milk and butter stored at atmospheric temperatures has been studied. *Salmonella typhi, paratyphi A, paratyphi B, cholerae suis, typhimurium, dublin* and *bovis morbificans* were examined as these species have been associated with milk-borne epidemics. They all multiplied readily even at 15° C., and from this it is concluded that whether the primary contamination of milk arises from the cow as with *S. dublin,* or from a human carrier as with *S. typhi,* the important factor in the development of an epidemic is the ability of these organisms to multiply during storage. These organisms did not multiply in butter similarly stored and actually died out gradually, but viable organisms survived for many weeks.

E. J. P.

REVIEW

[Agricultural Journal of the Department of Agriculture, Fiji. Vol. IX. (3.).]

The journal under review is the third number of Volume ix of this quarterly publication. The subject matter is a collection of short articles by members of the staff of the department on agricultural problems chiefly of local interest; the only reference of veterinary interest is a brief account of distemper in dogs. In this account it is stated that "the occurrence of distemper amongst dogs in Fiji is remarkable for the very long intervals which have occurred between epizoötics of this disease. Although it is almost certain that distemper occurred prior to 1923, there appears to be no written record of its occurrence. In 1931, however, a most acute epizoötic of this disease took place in Fiji and the mortality at that time was very heavy. Following the subsidence of that outbreak no further cases occurred until this year."

It is observed that the veterinary staff of the department comprises one veterinary officer and one stock inspector, but there appear to be vacancies for more veterinary officers.

REPORT

[Northern Rhodesia: Report of the Veterinary Department for the Year 1937 (J. P. A. Morris).]

The Report of the Veterinary Department of the Government of Northern Rhodesia, under Mr. J. P. A. Morris, M.R.C.V.S., with Mr. P. L. le Roux, D.Sc., M.R.C.V.S., as Veterinary Research Officer, for the year 1937, affords a good example of the appalling difficulties against which the veterinarian has to contend in our overseas possessions. The first part of the report gives a list of eight qualified veterinary officers and eighteen lay assistants, upon whom devolves, with the assistance of a numerous native staff, the work of controlling animal diseases and making the country a more habitable place for stock. That the personnel and facilities are inadequate is revealed by the admission that "the veterinary side of the Research Station, Mazabuka, is inadequately financed, and understaffed, with the result that little pure research can be undertaken with any assurance of continuity." It is not surprising, therefore, to read in Section I of the report, which deals with the general development of the pastoral industry, that "no marked improvement can be reported in the animal husbandry system of the Territory." Nor, when we come to Section II which gives a catalogue of 66 diseases which decimate the stock of that unfortunate country, do we wonder that so little progress is made. We can only congratulate Mr. Morris that "the health of the staff has been uniformly good." In such trying circumstances one would have expected it to be uniformly bad. The list of diseases is a veritable encyclopaedia. In it we recognise many of the common ailments of animals in Great Britain but, in addition, there are others we wot not of. For example, Tenkobo skin disease, posterior paralysis and various vegetable poisons add a little local atmosphere to the report. It is in the endeavour to control the unknown that the veterinary administrator in the Colonies encounters the greatest difficulty of his unenviable task. In such circumstances, therefore, it is to be regretted that research is inadequately supported.

It is disconcerting to note that rabies is "widely distributed in the Territory and many outbreaks remain unreported," but it is very fortunate that, considering the high incidence of rabies in canines, so little hydrophobia occurs in humans. It may be recalled that this alarming disease existed in Southern Rhodesia during the early part of the century and was only controlled after 64,000 dogs had been destroyed. It is to be hoped that in Northern Rhodesia the elimination of this infecton may

be more easly effected. Trypanosomiasis is another serious menace to man and animals, approximately five-eighths of Northern Rhodesia being infested by the tsetse fly, while mechanical transmission by biting flies other than *Glossinae* occurs. The disease appears to be enzoötic in certain areas, and according to medical reports, sleeping sickness may exist in endemic foci with the result that "carriers" of infection are created and migrating to other fly-infested areas, disseminate infection. According to the late Mr. Swynnerton, some four-and-a-half million square miles of Central Africa are infested by various species of *Glossina*—25 in all have been identified—and Northern Rhodesia is on the southern margin of this vast area. It is highly improbable that it will ever be possible to "swat" the last pair of tsetse flies in four-and-a-half million square miles of often inaccessible country, so that the prospect of the effective control of trypanosomiasis in Northern Rhodesia appears somewhat remote, unless by further research a method of immunising man and animals against infection becomes possible. At present, however, there is little or no research in this direction and Central Africa must remain unsuitable for beneficial occupation or development, even by refugees from Germany.

Time and space do not permit of an adequate review of this valuable report, or even of a careful perusal of the tables which are of local rather than general interest. The tone of the report, however, does not indicate that Mr. Morris and his staff are in any way appalled by the magnitude of the task which they have undertaken with characteristic enthusiasm and efficiency.

L. E. W. B.

UNITED KINGDOM PIG POPULATION

From information collected by the Government as at September 4th, it would appear that the pig population of Great Britain has been tending downwards. In the case of England and Wales, the total of all classes discloses a reduction in 1938 of 155,000 compared with last year. In Scotland, however, the pig population was slightly higher, being 288,000 or 12,000 more than a year ago at the date mentioned. For the whole of Great Britain the reduction was 142,000. As compared with the numbers recorded for Great Britain at the same date last year, there were decreases of roughly 5 per cent. in all classes of pigs with the exception of boars, the numbers of which remained stationary. Of other pigs, over five months there was an increase of 3 per cent., but the total fell by 3 per cent. In Northern Ireland, there was a decrease but of only 2,000, the decrease for the United Kingdom being 145,000, or a decline of almost 3 per cent. It is noted that there was a decrease of 4 per cent. in the number of sows kept for breeding purposes.

N.V.M.A. DIVISIONAL REPORTS

Central Veterinary Society

MEETING AT THE ROYAL VETERINARY COLLEGE

The Presidential Address (by Mr. Nevill S. King) and a demonstration of the diagnosis of skin diseases (by Mr. J. W. H. Holmes) were features of interest at a well-attended meeting of the Central Veterinary Society held at the Royal Veterinary College and Hospital on the evening of Thursday, December 1st, 1938.

There were present: Mr. N. S. King (President) in the Chair, Miss M. L. Bingham, Mr. W. Brown, Capt. R. Bryden, Mr. H. E. Bywater (Hon. Secretary), Major A. A. Comerford, Major W. Denington, Miss C. M. Ford, Mr. C. Formston, Lt.-Colonel H. Greenfield, Dr. Tom Hare, Messrs. H. J. Hassocks, S. L. Hignett, S. F. J. Hodgman, Miss R. E. Holman, Messrs. H. D. Jones, Herbert King, H. C. P. King, Major Hamilton Kirk, Lt.-Colonel G. P. Knott, Messrs. F. Land, H. Lomas, Professor J. McCunn, Messrs. A. B. MacIntyre, J. W. McIntosh, Professor W. C. Miller, Dr. R. F. Montgomerie, Messrs. C. W. Ottaway, W. Perryman, G. S. Peyton, C. R. A. Powell, Chas. Roberts, N. J. Scorgie, G. W. Searles, W. Taylor, Miss O. Uvarov, Capt. P. W. Walker, Messrs. E. G. White, J. D. Williams, Professor J. G. Wright and Professor Geo. H. Wooldridge.

The following were present as visitors: Capt. J. L. Dalzell, Mr. J. Francis, Miss J. Joshua, Miss H. Neve, Mr. John Pasfield, Miss D. Simpson, Major G. F. Steevenson, Miss R. Teverson and Miss E. J. Thomson.

The minutes of the Annual General Meeting, also the report of the proceedings at the Annual Dinner, which had received publication in the *Veterinary Record*, were taken as read and were confirmed and signed, on the proposition of Professor Wooldridge, seconded by Mr. C. Roberts.

The Secretary announced the receipt of apologies for their inability to attend the meeting from Professor T. Dalling, Major-General Sir John Moore, Capt. S. J. Motton, Mr. H. L. Roberts, Drs. A. W. Stableforth and W. R. Wooldridge.

Tributes to the Late Mr. F. W. Willett

Obituary.—The President said that since their last meeting he had to report, with deep regret, the death of Mr. Frederick W. Willett, of Staines. He would ask the meeting to stand a while in his memory, following which Mr. Perryman desired to pay a tribute.

Mr. W. Perryman said that he claimed the privilege of speaking on that melancholy

occasion—the time for paying tribute—in reference to their friend, Mr. Frederick Willett. A great many of them knew him well, for he had been an active member of that Society, as of others; indeed, he thought Mr. Willett was one of the oldest in membership of the "Central."

He claimed that privilege because he thought he could say that he knew Frederick Willett longer than anyone in the veterinary profession not in the family of their late member. Mr. Willett and he entered college in the same year—the year 1885—and he well remembered seeing him with a group of some 70 new students, a number which, he believed, at that time was a record. They were waiting about just outside the old theatre. His hearers would know how a number of those students would be nervously awaiting events, having just come up to college. He (the speaker) was one of those, and Fred Willett was the first person to whom he spoke as a student, and throughout the time of their college career they always had the most material respect for one another. It was a happy and valuable relationship for him, for Fred Willett was a conscientious, thorough and good student: he was determined to make good and he did so. During the whole of his college career he was, in relation to his colleagues, what was perhaps best indicated by the phrase "one of us." May be that expression applied to many students to-day; he dare say that, at the present time, there were some who went through college in an atmosphere of universal friendliness, as Willett did, and who made friends who would remain so from the first term to the last and from that time onward. At all events, Willett and he passed through college together and came out in the same year. Frederick Willett returned to his father's practice at Staines and he to London; consequently, they still met frequently and always with the greatest pleasure.

To Mrs. Willett and her family he was sure the whole of the profession would extend their deepest sympathy. Having attended the funeral the previous week, he realised what appreciation they felt of the kindness and good fellowship extended to them, while to him it was a source of gratification to have the evidence of the size of the assembly (the church was full) of the high appreciation in which a member of the profession, and his friend, was held by his fellow townsfolk. It must be a comfort to the bereaved to know that not only his fellow members of the profession but his fellow citizens esteemed Frederick Willett so highly and so fully appreciated his worth.

Mr. J. W. McIntosh rose to say that he wished to endorse every sentiment of appreciation expressed by Mr. Perryman in his moving tribute to the memory of their friend, Mr. Fred Willett. It had been his privilege to enjoy the closest friendship with Mr. Willett for the past 30 years, and those of them who knew him would know that he was a man of great personal charm, a man who held the profession in the warmest love and did a great deal to uphold its dignity and its usefulness. He was also a man who was ever ready to hold out a helping hand to those in need. The speaker desired, in a word, to associate himself with all that Mr. Perryman had said.

The President informed the meeting that the Secretary had written to the family expressing their very deep regret and sympathy, and sending a wreath. An appreciative reply had been received. [This was read to the meeting.]

Proceeding, the President spoke of the deep regret with which news had been received of the loss to the profession of another excellent man in Mr. Fred Harvey, of St. Columb. Mr. Harvey was known probably to the majority of them: although he was not a member of that society, his work in examining students, his literary work and his general interest in the profession were well known to them all. It would therefore, he was sure, be their wish that they should stand again, in silent tribute to the memory of Mr. Fred Harvey.

Nominations and Elections.—The following were nominated for election as Fellows of the Society: Miss D. Howell, of Bury Farm, Upshire, Waltham Abbey, Essex (Proposer, Dr. McCunn; Seconder, the Hon. Secretary), and Mr. J. A. Pasfield, of Beech House, Hersham, Walton-on-Thames (Proposer, the President; Seconder, Miss Uvarov). Election as Fellows was unanimously made of Dr. M. F. Benjamin, 93, Praed Street, W.2 (Proposer, Sir F. Hobday; Seconder, The Hon. Treasurer); Miss M. L. Bingham, Research Institute in Animal Pathology, N.W.1 (Proposer, Mr. C. Formston; Seconder, Mr. J. W. H. Holmes); Mr. J. Francis, Research Institute in Animal Pathology, N.W.1 (Proposer, Mr. C. Formston; Seconder, Mr. J. W. H. Holmes); Mr. S. L. Hignett, The Royal Veterinary College, N.W.1 (Proposer, Mr. C. W. Ottaway; Seconder, Mr. C. Formston); Mr. E. S. Paterson, 29, William Street, Windsor, Berks (Proposer, Sir F. Hobday; Seconder, The Hon. Treasurer), and Captain R. Simpson, 7, Whitehall Place, S.W.1 (Proposer, Sir F. Hobday; Seconder, The Hon. Secretary).

Presidential Address

The President (Mr. Nevill S. King) now gave his Address from the Chair, as follows:—

It is the custom at this meeting for the President to deliver his address. In view of the interesting and instructive demonstration which we are to have from Mr. Holmes I intend to make the address a short one. The remarks which I have to make I shall confine rather to the future of the profession.

Two subjects of importance to the profession immediately come to one's mind: The report of the Interdepartmental Committee on Veterinary Education in Great Britain, and the centralisation of the veterinary services under the Ministry of Agriculture.

I had not intended to make much reference to the Loveday Report unless there had been published some statement either from the Council R.C.V.S., or from the Council of the N.V.M.A., therefore I was pleased to read in last week's *Veterinary Record* the resolutions of the Council of the R.C.V.S., and the report of Mr. Livesey's speech at the "Central" Dinner.

I gather that the criticisms that have appeared recently in the *Veterinary Record* are the opinions of the editorial committee and though I do not desire to be too critical myself, I would have wished that those remarks had been withheld until some full statement had been made by either the Council of the R.C.V.S., or the Council of the N.V.M.A.

Undoubtedly the Council of the R.C.V.S. take a serious view of some of the recommendations of the Loveday Report, and I think that most veterinary surgeons will agree with them.

The recommendation that the Council of the R.C.V.S., should have representatives of various universities on it is entirely foreign to us. We might as well go to the Medical Council and say "We want to be represented on your council and help you run your show." The only show we should get would be the door. By that I do not mean that we want to cut adrift from the universities. On the contrary, we do appreciate our association with the universities from the educational and other points of view.

As the President of the R.C.V.S. so rightly and very properly said at our Dinner, "He would like to express the hope that no recommentation they had made should in any way interfere with the good relations which had existed for 50 years between the governing body and the schools."

There are good points in the Loveday Report and I think there are three that stand out particularly. The first is the suggestion that the one-portal system of entry to the profession should remain; the second, the necessity for an early enquiry into government legislation to control unqualified practice, and the third, the fact that a large sum of money should be spent on veterinary education: though where this is to come from in these days, when almost every penny is required for other purposes, it is difficult to see.

Although we, as a profession, cannot agree with everything in the Loveday Report, we do agree that there is much in it that is good and it certainly shows that much time, hard work and investigation have been put into its preparation, and our thanks are due to those members of the committee who have devoted so much of their time and thought to it. Though we do not see eye to eye we must feel grateful for any scheme that is likely to advance the veterinary profession.

That is all I propose to say on the Loveday Report. I would like to say just a few words about the centralisation of the veterinary services.

When I heard Mr. Morrison speak on this subject at the Bournemouth Congress last year I came away from that Dinner full of depression—not for myself, but I was thinking of the country practitioner who is engaged almost entirely in cattle practice. Since the scheme has been in operation I am beginning to change my mind. Of course, one realises that the country practitioner as such, must eventually fade out and his place be taken by the whole-time veterinary inspector. This will probably not happen for a considerable time but I can see no alternative. I do not know whether this was in the mind of the Minister for Agriculture, but with the rigid clinical inspection of dairy herds, tuberculin testing, and control of contagious diseases there will be very little left for the practitioner to do in the country.

One has heard that the veterinary practitioners are not pleased with the scheme, some because they have not been included, some because they have too much to do and some because they have not enough. We must remember that this scheme is a very large one and involves a big change in the profession. Any transition stage in any way is bound to be difficult at first and to produce a certain amount of hardship. I feel that time is young yet either to approve or to condemn, but I do feel that the Ministry are introducing schemes which will compensate the part-time inspector very considerably for losses that he has sustained in other ways.

To return to the business of this Society, I would like to say in conclusion that I am looking forward to the future meetings of the Society in the hope that our papers and discussions will be of interest to all the Fellows and will promote a free exchange of knowledge and ideas. In these days the clinician is collaborating more and more with the laboratory worker, with resultant benefit to both. Therefore, I hope that the Fellows will cast off that shy attitude that is characteristic of some of us and will let us all have the benefit of their observations and experiences. (Applause.)

The President having concluded his address, Mr. McINTOSH said that he was sure they would all wish to accord Mr. King a very hearty vote of thanks for his most interesting address. (Applause.) He had, as they knew, touched upon two very important subjects and done it very well and very diplomatically.

The vote of thanks was accorded with acclamation.

Demonstration of the Diagnosis of Skin Diseases.—In the absence of the presentation of any *post-mortem* specimens, and of any other business, the meeting, dividing itself into two parties for the purpose, proceeded to other parts of the building, where an admirable demonstration of the diagnosis of skin diseases had been arranged by Mr. Holmes, who explained the technique of the methods illustrated. [This demonstration was on the lines of that given by Mr. Holmes at this year's Congress of the N.V.M.A. at Glasgow. A full account of that demonstration will be found on reference to the *Veterinary Record* of October 8th last (*V.R.* **50**. 41. 1331-1335).] The exceedingly interesting and useful contribution to their proceedings was greatly appreciated by the Fellows of the Society and the visitors.

H. E. Bywater, *Hon. Secretary.*

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Scottish Metropolitan V.M.A.*

MEETING AT THE "DICK" COLLEGE

A general meeting of the Scottish Metropolitan Division, N.V.M.A., was held in the Royal (Dick) Veterinary College, Edinburgh, on the afternoon of Wednesday, October 5th, 1938.

The President (Mr. J. N. Ritchie) occupied the chair and there were also present: Messrs. W. Anderson, G. F. Boddie, A. Brownlee, A. K. Cameron, H. F. Downie, H. Dryerre, E. G. Duncan, J. D. Ferguson, W. Harris, W. M. Henderson, H. H. Holman, R. G. Linton, W. S. Lornie, J. B. Mackie, W. M. Mitchell, U. F. Richardson, A. L. Robertson, J. Stewart, A. W. Taylor, J. A. Taylor, D. R. Wilson, H. M. Wilson, P. Wilson, E. G. Wood, and the Hon. Secretary, together with the following visitors: Sir Arthur Olver, Messrs. A. T. Cowie, J. McDonald, W. N. M. Ramsay, A. Thomson and a number of students.

The minutes of the previous meeting, which were published in the *Veterinary Record* of October 1st, were taken as read and approved.

Correspondence.—(1) From Dr. J. Russell Greig, Dr. W. S. Gordon, Messrs. A. Baird, A. Gofton, J. Gibson, F. J. V. Mayne, W. Nairn, D. S. Rabagliati and E. J. H. Sewell, apologising for absence. (2) From the General Secretary, N.V.M.A., with regard to the organisation by the Division of a short Refresher Course in Poultry Husbandry and Disease Control. It was decided to approach the college authorities on the matter.

Resignations.—The following resignations were accepted with regret: Messrs. A. M. Grant, Haddington; A. Spreull, Jun., Dundee; A. P. Steele, Edinburgh, and W. J. Young, Edinburgh. The Secretary was instructed to request Major E. D. S. Robertson to reconsider his decision to resign.

Nominations.—The following were nominated for membership of the Division: Messrs. D. Cameron, Perth; I. H. Chalmers, St. Boswells; T. G. Dunbar, Edinburgh; G. D. Munro, Cupar; P. G. Morris, Edinburgh; J. McLaren, Duns; D. J. Macpherson, Cupar; Sir A. Olver, Edinburgh, and A. Withers, Edinburgh.

Elections.—The following, who had been nominated for membership at the June meeting, were duly elected: Messrs. E. G. Duncan, Galashiels; A. B. Kerr, Hamilton; D. S. Rabagliati, Edinburgh, and A. Robertson, Edinburgh.

Formal Election of Office Bearers.—In order to conform with the rules of the Association, the office-bearers who had been nominated at the June meeting were elected *en bloc.*

Veterinary Film.—The main feature of the meeting was a film, "The Treatment of Bone Fractures in the Dog and Cat," shown by Messrs. T. J. Smith & Nephew, Ltd., Hull. As an introduction to the film, Dr. H. Dryerre, Edinburgh, gave a short talk on "Some Physiological Aspects of Bone Repair." The film was followed by a demonstration of a method of treating fractures of the femur, by A. Thomson, Esq., M.R.C.V.S., Glasgow.

Professor Linton proposed a vote of thanks to the speakers and to Messrs. Smith & Nephew for their excellent film. This was carried with acclamation.

Professor Boddie brought up the matter of a Jubilee Celebration by the Division. After some discussion the matter was dropped.

The President concluded the proceedings by moving a vote of thanks to the college authorities for granting facilities for the meeting. A collection, taken on behalf of the Victoria Veterinary Benevolent Fund, amounted to £3 7s. 6d. Tea was afterwards served in the O.T.C. room.

Alex. Robertson, *Hon. Secretary.*

*Received for publication December 9th, 1938.

HOTELS FOR HORSE RIDERS

It is said that horse riders are to have their own specially appointed hotels, like motorists. The Institute of the Horse and Pony Club announce that 500 country inns with stabling are to be registered. A sign depicting George III on horseback will be hung outside them.

ROYAL COLLEGE OF VETERINARY SURGEONS

Membership Examination

LIST OF SUCCESSFUL CANDIDATES

(*Continued from page* 1784.)

Edinburgh

THIRD YEAR:

Alexander, Frank (H)	Mannan, K. A.
Bell, David	Milne, W. M. (P)
Birtwhistle, J. F.	Nelson, Daniel
Cameron, Douglas (A)	O'Neil, J. A.
Edgar, Thomas	Ross, James (A)
Etoe, D. R.	Saksena, P. D.
Fletcher, W. E.	Sinclair, D. F.
Flodin, P. M.	Storror, David (A) (H)
Forbes, D. L.	Twiss, A. F.
Gordon, W. A. M.	*Urquhart, J. W.
Gray, J. A.	Waugh, Robt.
Kershaw, G. F.	Williams, F. M.
Lamont, A. A.	Young, Archibald
Mackenzie, H. H. S. (A)	

(*) Denotes second class honours.
(P) Denotes credit in Pharmacology, etc.
(A) Denotes credit in Anatomy.
(H) Denotes credit in Hygiene.

FIFTH YEAR:

Adams, J. A.	Luxmoore, H. B.
Carmichael, M. A.	Macrae, R. I.
Clouston, D. S.	Milne, A. H.
Hood, D. M.	Newhouse, James
Jagger, Frank	Parker, Eric
Laird, David	Rae, A. G.
Lawson, John	Wood, S. W.

CLASS D:

Johnston, W. J. G.	Macleod, A. M.

(*To be concluded.*)

Erratum.—In the article by R. F. Montgomerie and A. Thomson (*Vet. Record,* Dec. 24th), penultimate line of column 2, page 1769, for "significant" read "insignificant."

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Heavy horse trade was mentioned at a recent meeting of the National Farmers' Union Council. The Livestock Committee reported that as the Union was now in possession of figures, supplied by the Shire Horse Society, which proved conclusively that in recent months heavy draft horses were having a very bad sale in the markets of England and Wales—many being withdrawn at each sale—it was resolved to reopen with the Import Duties Advisory Committee the question of a duty on imported horses. It was agreed to keep the National Horse Association and the Shire Horse Society in touch with what the Union proposes to do.

In Parliament

The following questions and answers were recorded in the House of Commons prior to the Christmas Recess:—

PUBLIC HEALTH: COW-SHEDS

Mr. J. MORGAN asked the Minister of Health whether he is prepared to authorise a survey of all farm buildings at present in use as cow-sheds for producing milk for human consumption, with a view to scheduling for the necessary reconstruction in a reasonable period of time such premises as may be found unsuitable?

The Minister of Health (Mr. ELLIOT): No authorisation by me of such a survey as is suggested by the hon. Member is required. The enforcement of the provisions of the Milk and Dairies Orders in relation to farm buildings is a matter for the appropriate local sanitary authorities.

Mr. MORGAN: Is not the right hon. Gentleman aware that only 22,000 farmers out of 120,000 have been able to get up to the standard laid down by the Milk Board for their accredited scheme, and that the board are now satisfied that farm premises are responsible for this?

Mr. ELLIOTT: It is for the local sanitary authorities to enforce the regulations.

Mr. MORGAN: Cannot the right hon. Gentleman draw the attention of the local authorities to the necessity of improving the national milk supply in this respect?

Mr. ELLIOT: Local authorities have certain duties entrusted to them by Parliament, and they are a little jealous of inroads on their duties and privileges by the central authority.

Mr. ATTLEE: Has the right hon. Gentleman no responsibility if he finds that local authorities are not carrying out their duties?

Mr. ELLIOT: Yes, but that is a general responsibility.

Mr. MORGAN: Will the right hon. Gentleman bear in mind that this is a serious matter in view of the extraordinary steps the Minister of Agriculture is taking by premium payments to get a good milk supply, at a cost of millions of pounds to the taxpayer?

Mr. ELLIOT: Yes, it is important, and so are a great many other steps.

At a meeting of the Council of the British Friesian Cattle Society, 78 new members were elected, making a total of 287 new members enrolled during the current year. It was announced that certificates had been issued in respect of nine further pedigree British Friesian cows that had produced upwards of 50 tons (11,200 gallons) of milk in their lifetime. It was unanimously agreed that Mr. Ernest B. Hall be nominated as President-elect to follow Mr. Albert Weightman, who is to be President of the Society for 1939.

Notes and News

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

1939

Jan. 2nd.—Meeting of the Editorial Committee, N.V.M.A., at 36, Gordon Square, W.C.1, 4 p.m.

Jan. 2nd.—N.V.M.A. Committee Meetings.

Jan. 3rd.—N.V.M.A. Committee Meetings and Council Meeting.

Jan. 5th.—Meeting of the Central Division, N.V.M.A., at the Conway Hall, W.C.1, 6.30 p.m.

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THE LOVEDAY REPORT

We regret that owing to a misunderstanding we published in last week's *Record* a resolution passed by the Midland Counties Veterinary Medical Association concerning the Loveday Report. This publication was premature and we desire to express our sincere apologies to the President and Members of this Division for our unintentional discourtesy.

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At a meeting of the Council of the Society of Veterinary Practitioners held in London on Tuesday, December 13th, the following resolution was passed:—

> "That the Council of this Society wishes to place on record its general approval of the recommendations embodied in the Loveday Report and is of the opinion that these recommendations, with special regard to those relating to facilities for the teaching of practical animal husbandry and preventive and curative medicine, will operate in favour of better-trained graduates entering the profession, thus providing a fully-trained personnel more in accord with modern requirements both for the State Service and private practice."

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PERSONAL

Sir Frederick Hobday's Illness.—We are exceedingly glad to be able to report that a very marked improvement in the health of Sir Frederick Hobday has taken place since we made reference to his serious illness in our last issue. Although Sir Frederick's condition shows a great advance, he is still very easily tired and his medical advisors therefore deem it inadvisable for the time being to remove the ban imposed upon the receipt of visitors.

R.C.V.S. OBITUARY

The Late James Sommerville, M.R.C.V.S.

A Tribute

A correspondent writes as follows in reference to the death of Mr. James Sommerville, M.R.C.V.S., of Clarkston, Glasgow, reported in our last issue.

"It came as a severe and unexpected blow to his many friends to learn last week of the death of James Sommerville, M.R.C.V.S., of Clarkston, Renfrewshire, at the age of 59. Until recently, there was nothing to indicate that his life would not extend over a much longer span.

"Trained in Glasgow Veterinary College, Mr. Sommerville graduated there in 1909, and shortly afterwards went to Perth as assistant to the late Mr. James Reynard, M.R.C.V.S. Later he transferred to Edinburgh, where he had been appointed to a post in the Veterinary Department of the Corporation, and continued there until the outbreak of the War, when he joined the R.A.V.C. and served throughout the war period in France.

"Returning home when peace came, he took over the veterinary practice at Clarkston that had been carried on for many years by Mr. David Allan, M.R.C.V.S. At that time, the practice was almost exclusively concerned with farm animals, and while Mr. Sommerville continued that branch, he in addition, by his industry and skill, and the adoption of modern methods, developed the small-animal side of practice until he became widely known in Scotland as an outstanding canine practitioner.

"Although Mr. Sommerville did not take an active part in the public affairs of the profession, he followed current events with alert intelligence, and was always a member of the N.V.M.A. and of the West of Scotland Division, living on easy and cordial terms with other veterinary surgeons in the neighbourhood, practitioners and whole-time officers alike. His interest was chiefly in his work and his friends. It has always been a wonder to the writer of this note that Mr. Sommerville, with his free and sociable disposition, never married, but there it is. He is mourned by other near relatives with whom he maintained close contact.

"Signs of cardiac trouble began to show themselves a few months ago, without at first causing undue alarm, but they continued and developed in spite of medical and specialist attention; still it appeared that with rest and care they would eventually subside. Only a few days before he died, when the writer called on him, he was sitting up in bed and chatted briskly and cheerfully about all manner of things. Little did it then appear that two old friends were talking together for the last time. Soon afterwards, a coma set in, and on the morning of December 15th he died. He was one who will be missed by many."

The funeral took place on Saturday, December 17th, the following members of the profession being present at the Glasgow Crematorium: Mr. Donald Campbell, Mr. Wm. Anderson, Mr. S. G. Abbott, Professor Wm. Robb, Mr. A. H. F. Robb, Mr. W. S. McMurrich, Mr. J. G. McGregor, and Mr. Alexr. Thomson.

Howe, George, Newmarket Street, Buxton, Derbyshire. Graduated N. Edinburgh, April 15th, 1887. Fellowship, April 28th, 1892. Died December 19th, 1938; aged 77 years.

Mr. George Howe, F.R.C.V.S.

Through the sudden death of Mr. George Howe, which we record with much regret, Buxton loses one of her leading citizens and a former Mayor of the town. For 18 years he had served on the Town Council, and was Mayor in 1930-31. He took the lead in reviving Buxton's annual Well-dressing Festival after the War, and continued as chairman of the Well Dressing committee until last year.

For many years Mr. Howe, who was well known throughout Derbyshire as a veterinary surgeon, was chairman of the Buxton and District Agricultural Society, and he was officially connected with the Chapel-en-le-Frith, Hope and Tideswell Agricultural shows. He had bred Clumber Spaniels for the Royal kennels at Sandringham.

Mr. Howe was chairman of the Buxton Constitutional Club, holding the long-service medal of the Association of Conservative and Unionist Clubs; vice-chairman of the Buxton branch of the High Peak Unionist Association, a Freemason, and chairman of the Buxton branch of the Royal Society for the Prevention of Cruelty to animals. He leaves three sons and a daughter, to whom our deep sympathy is extended.

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VICTORIA VETERINARY BENEVOLENT FUND

Ladies' Guild Dance

A very successful dance was held by the Ladies' Guild at Princes Galleries, Piccadilly, on December 8th, which resulted in raising the sum of £78 10s. for the Victoria Veterinary Benevolent Fund. There was an attendance of 206 members of the profession and their friends. The success of the evening was in large measure due to the zeal of the President, Mrs. G. H. Wooldridge, and the Hon. Secretary in disposing of tickets and for the organisation of the function. During the evening a number of "spot" dances were held, and the prizes, which were given by Mrs. J. B. Buxton, Mrs. R. E. Glover, Mrs. H. King, Mrs. H. T. Matthews, Mrs. M. N. Nickinson, Mrs. P. J. Simpson, Mrs. G. H. Wooldridge, Mrs. W. R. Wooldridge, and Mrs. W. G. Wragg, were distributed by the President.

Several competitions were also held, and in each case the generous winners had their prizes put up to auction, the bidding for which was very brisk, thanks to the persuasive efforts and talent of the "auctioneer," Professor G. H. Wooldridge.

During the evening Mr. J. W. McIntosh, who was one of the senior members of the Council of the Victoria Veterinary Benevolent Fund present, thanked the Ladies' Guild, on behalf of the Fund and everyone present, for the very excellent work they were doing. He said that the Benevolent Fund had many claims made upon it, that they were interpreted as generously as funds permitted, and that with the magnificent help of the Ladies' Guild it had been possible to extend that help considerably. Special thanks, Mr. McIntosh said, were due to the lady President, Mrs. G. H. Wooldridge, and also to the newly appointed Secretary, Miss Wragg, and to their many helpers for the success of the evening. He thought that they could claim that the function was one of the most successful that had been held under the auspices of the Guild, and that it must have been very gratifying and encouraging to the promoters of the dance that their efforts were so well supported and appreciated. In conclusion, Mr. McIntosh expressed the hope that the good work of the Ladies' Guild would be continued in such a noble cause.

The President, Mrs. G. H. Wooldridge, in reply, thanked the company for the wonderful support given. It was her sincere hope that everyone was enjoying the dance and that they would all come again next year and bring their friends with them.

Lt.-Col. and Mrs. P. J. Simpson, the founders of the Ladies' Guild, sent a telegram wishing the company a happy and successful evening, but unfortunately, through some misunderstanding, it was not delivered in time to be read at the dance.

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FOOT-AND-MOUTH DISEASE

At the end of last week outbreaks of foot-and-mouth disease were confirmed among cattle at Reydon, Suffolk, and at Lisvane, Glamorgan.

The area in which restrictions in the movement of animals have been imposed in respect of the outbreak at Reydon lies in the county of Suffolk, and has been added to the existing infected area round Lowestoft. The counties affected by the outbreak at Lisvane are Glamorgan and Monmouth.

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ARMY VETERINARY SERVICE

London Gazette—War Office—Territorial Reserve of Officers

Dec. 23rd.—Major L. P. Pugh resigns his commission, and retains his rank, with permission to wear the prescribed uniform (December 24th.)

India Office

Dec. 23rd.—Major H. Stevenson, M.C., R.A.V.C., has vacated his appointment as D.A.D.V.S. in India (August 29th).

Major A. J. Kelly, R.A.V.C., has been appointed D.A.D.V.S. in India (August 29th).

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VIRUS INFECTIONS OF THE CENTRAL NERVOUS SYSTEM

The following article (reproduced from the *Lancet*, October 29th), gives a survey of various infections of the central nervous system in the human subject and is of special interest in that it depicts the close relationship between some of the rarer forms of these infections in man and those in animals:—

"Of late years much has been learnt about virus infections of the central nervous system in man. About five years ago the only two nervous diseases certainly known to be caused by viruses were rabies and acute anterior poliomyelitis; the nature of encephalitis lethargica had not been definitely established and still less was known of the causation of other forms of encephalitis. One should perhaps include zoster along with rabies and poliomyelitis, for the classical work of Head and Campbell had shown this condition to be primarily an infection of the ganglia on the posterior nerve-roots and the posterior horns of the spinal cord—a posterior poliomyelitis—and its attribution to a virus, if not beyond question, was certainly more than a surmise.

"To-day several others can be added to these three. In the summer of 1933 a form of epidemic encephalitis appeared in St. Louis which differed from encephalitis lethargica both in its greater infectivity and in its clinical features. It was soon found that the differences went further than this, for Webster and Fite[1] were able to transmit the disease to mice and in consequence it was shown that the virus differed from other known neurotropic viruses infecting man. Japanese B encephalitis, which appears in Japan in epidemic form during the summer months, and which resembles St. Louis encephalitis in many ways, has now been proved to be caused by a virus serologically distinguishable.[2] It is not known whether the natural occurrence of these two diseases is confined to the human species; but rabies is no longer the sole example of a virus infection of the central nervous system in lower animals which is communicable to man. Louping-ill, a disease of sheep in the northern part of Britain and in other parts of the world, appears to be capable of producing an encephalitis in man; Rivers and Schwentker[3] have described four cases of laboratory infection with this virus and it has been suggested that a form of human encephalitis observed in Australia, and known there as X disease, is possibly due to the virus of louping-ill. And, quite recently, the investigations made by Fothergill, Dingle, Farber, and Connerley[4] on a boy who died of encephalitis in Boston seem to show that the virus of equine encephalomyelitis is also capable of producing illness in man. Equine encephalomyelitis occurs in epidemic form in certain parts of North America. Two different types are recognised—one seen east of the Appalachian mountains and the other to the west—and though the clinical picture is similar, the viruses are serologically different and the epidemiological characteristics not quite the same. Both forms break out in the late summer and autumn and during this last summer the Eastern type has been present in Massachusetts in epidemic form. Simultaneously cases of encephalitis have been arising among infants and children.

"The case now reported by Fothergill and his colleagues was that of a seven-year-old boy admitted to the Children's Hospital, Boston, with high fever, generalised rigidity, and coma. The onset had been acute; the cerebrospinal fluid showed 2,000 cells per c.mm. (most of them leucocytes), a total protein of 190 mg. per 100 c.cm., and a normal glucose content. The fluid was sterile bacteriologically and the patient died a few hours after admission. *Post-mortem* examination gave evidence of an acute encephalitis which was characterised histologically by destruction of neurons and focal and perivascular infiltration with mononuclear and polymorphonuclear cells, these changes being noted in many areas of the cortex and mid-brain but not in the spinal cord. Culturally the brain tissue was sterile, but suspensions of it injected into the brains of albino Swiss mice induced an encephalitis ending fatally in two or three days. The virus passed Berkefeld N. and V. filters and was pathogenic to rabbits and guinea-pigs. Finally it was shown that the virus failed to produce disease in two guinea-pigs actively immunised against the Eastern form of equine encephalomyelitis, whereas it infected two normal guinea-pigs and, with equal ease, one immunised against the Western type. This observation has now been confirmed and extended by Webster and Wright,[5] who have succeeded in isolating virus from the brains of five out of seven children dying in Massachusetts and have established the identity of these strains of virus with that of Eastern equine encephalomyelitis. The preventive steps taken by the public health authorities are described by one of our American correspondents on page 1020."

[1]Webster, L. T., and Fite, G. L., *J. exp. Med.* 1935, **61**, 103.

[2]Kawamura, R., Kodama, M., Ito, T., Yasaki, T., and Kobayakawa, Y., *Arch. Path.* 1936, **22**, 510.

[3]Rivers, T. M., and Schwentker, F. F., *J. exp. Med.* 1934, **59**, 669.

[4]Fothergill, L. D., Dingle, J. H., Farber, S., and Connerley, M. L., *New Engl. J. Med.* Sept. 22nd, 1938, p. 411.

[5]Webster, L. T., and Wright, F. H., *Science*, Sept. 30th, 1938, p. 305.

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TWO PROBLEMS IN VIRUS IMMUNITY

"The very solid immunity that follows infection with many viruses has excited much curiosity and prompted much investigation, especially during the last decade. Two questions have proved particularly intriguing: how far is persisting immunity determined by persisting latent infection, and how far is that immunity cellular and how far humoral in nature? These questions are raised again in papers lately appearing on both sides of the Atlantic; but unfortunately neither has yet been finally answered.

"Fresh examples have been brought forward in which viruses have been shown to persist for long periods in animals that are recovering from recent infection or are harbouring an inapparent infection contracted either naturally or by immunisation with living virus. Thus Traub[1,2] found that in certain stocks many mice harboured the virus of lymphocytic choriomeningitis, which could be recovered from their blood, urine, or nasal secretions, for at least 200 days. As a rule, the younger the mice at the time of their infection the longer the carrier state. Carrier mice were highly immune to the virus though it was possible to produce immunity in the absence of the carrier state. Webster[3] immunised mice against the virus of the St. Louis type of encephalitis by means of a single dose of living virus injected subcutaneously or intraperitoneally. Immunity began to appear within four days, was maximal in a week, and had disappeared after 20 weeks. Virus persisted in the spleen of the immunised mice up to 34 days after injection—that is, during the period when immunity was at its height. In this country Bedson[4] has found that in mice actively immunised with formalin vaccines against psittacosis and then injected with living virus, no open infection results but the virus may be present in the spleen for as long as seven months. A similar happening may follow injection of apparently neutral serum-virus mixtures. Again, the carrier state is accompanied by solid immunity. These new examples of the association of solid antiviral immunity with persistence of virus in the tissues lend support to the view, often put forward, that solid immunity to viruses depends essentially on such a carrier condition. It is, however, unwise to argue too confidently from one virus disease to another. Bedson's results in immunising mice with formolised psittacosis virus show that some immunity to a virus may

exist, even for months, in the absence of persisting infection. Bedson puts forward a tentative explanation of the way in which a latent psittacosis infection may maintain immunity, and lays stress on the probable rôle of antibodies. These, he suggests, prevent all but occasional cells from becoming parasitised by the virus and thus keep it within safe bounds while permitting "intermittent showers of virus" to provide antigenic stimuli. He is clearly opposed to a concept of tissue immunity unrelated to antibodies such as has been proposed by Levaditi.[5] A number of workers in America, on the other hand, appear to favour such a concept. Traub[1] reports that in mice recovered from, and immune to, choriomeningitis, antibodies are commonly not demonstrable, though in immune guinea-pigs they are definitely present. Shope[6] records that pigs recovered from swine influenza are refractory to human influenza virus, though their sera contain no neutralising antibodies active against it. It might be argued that in both these instances antibodies were present in undetectable amounts. The latest papers from Webster[3] and Hodes and Webster,[7] however, offer a more serious challenge to the upholders of the humoral school of thought. As already mentioned, they immunised mice against St. Louis encephalitis virus; such immunity appeared very rapidly and was apparently unaccompanied by the presence of any antibodies in their sera. But at the very time when the immunity was waning, antibodies began to appear in the serum and these remained for many weeks, being demonstrable after the mice had regained their susceptibility to infection. Elucidation of this paradoxical finding would go far to solve one of the knotty problems of virus immunity.—*The Lancet* (November 5th).

References

[1]Traub, E. (1936.) *J. exp. Med.* **63.** 847.
[2]———. (1938.) *Ibid.* **68.** 229.
[3]Webster, L. T. (1938.) *Ibid.* 111.
[4]Bedson, S. P. (1938.) *Brit. J. Exp. Path.* October. 353.
[5]Levaditi, C. (1926). L'herpes et le zona. Paris.
[6]Shope, R. E. (1937). *J. exp. Med.* **66.** 151.
[7]Hodes, H. L., and Webster, L. T. (1938). *Ibid.* **68.** 263.

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THE TESTING OF DISINFECTANTS

Stating "We have referred before to the proceedings of those committees of the British Standards Institution which have been engaged during the past few years in defining standard methods for the testing of disinfectants," a recent *British Medical Journal* annotation continues: "The need for authoritative definition of such methods can only be fully appreciated by those who have had experience with them; a variation of technique in any of a dozen directions may considerably affect the coefficient obtained, whereas rigid adherence to a method prescribed in every detail will give results which are constant within narrow limits. The original request for standardisation of the Rideal-Walker method came from the disinfectant industry, which has for many years accepted this test as an index of the quality of its products. Disinfectants are sold with a guaranteed Rideal-Walker coefficient, and discrepancies between the results of tests by seller and buyer, due often to varying technique, have been the cause of frequent disputes. The object of this effort was attained by the publication of a British Standard Technique for the Rideal-Walker test in 1934 (British Standard Specification No. 541, 1934). Whatever the commercial convenience of this achievement it did not meet the need for a recognised method of testing disinfectants under more severe conditions, designed to imitate those in which most disinfectants are expected to act. It is fairly generally known that a major obstacle to disinfectant action is what is usually called organic matter, represented, for example, when the object is the disinfection of excreta, by all the material of which faeces are composed. In the presence of such material some types of disinfectant which yield high Rideal-Walker coefficients become completely ineffective, and even disinfectants of coal-tar origin lose much of their activity as judged by the minimum dilution required for complete sterilisation. Moreover, this proportion varies with their composition, being least with phenol and solutions of cresols, and greatest with emulsions of tar acids of higher boiling-point, of which many proprietary disinfectants of this kind are composed. The Chick-Martin test, which actually employs faeces as added organic matter, has been used to a limited extent for many years as an index of practical disinfectant power, and it forms the basis of a second method, which has now been made the subject of a British Standard Specification.[1] The principal modification which this method has undergone is the substitution for dried faeces of a suspension of yeast; this change was originally proposed by L. P. Garrod,[2 3] and has several advantages. Dried human faeces, besides being unpleasant to prepare and work with, are of necessity inconstant in composition, whereas a suspension of commercial yeast is readily prepared, can be adequately standardised in composition, and represents organic matter in both dissolved and particulate form similar in nature to material of excremental or vegetable origin which a disinfectant may encounter in practice. It remains to be seen how far this test will be adopted by public health authorities and other users of disinfectants. The sphere of its applicability is not defined in the specification, but it will doubtless be recognised that the test is appropriate only for disinfectants to be used outside the body. The definition of suitable methods for assessing the capacity of surgical disinfectants is a task which has not yet been begun, nor is it, so far we are aware, even in contemplation."

(1) British Standard Specification for the Modified Technique of the Chick-Martin Test for Disinfectants, No. 808, 1938.
(2) *J. Hyg.*, Camb., 1934, **34**, 322.
(3) Ibid., 1935, **35**, 219.

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EQUINE ENCEPHALOMYELITIS

The American correspondent of *The Lancet* writes as follows, in the issue of December 10th, having drawn attention to the same matter in the issue of October 29th:—

"A report on the recent outbreak of human cases of equine encephalomyelitis in New England[1] was made to the American Public Health Association at Kansas City on October 26th. Dr. Roy F. Feemster said that when he left Massachusetts the virus had been recovered from seven patients and that some 30 additional cases were under investigation. Of the total known or suspected cases, over a third are in children under two, and over two-thirds in children under 10. One proven case is in a man of 55.

(1) See *Lancet*, Oct. 29th, 1938, pp. 1007 and 1020.

The onset in children is sudden and in adults more prolonged. Characteristic symptoms are fever (102° to 105° F.), irritability or drowsiness, headache, and convulsions. There is leucocytosis (14,000 to 65,000; 75 to 90 per cent. polymorphs). The spinal fluid, which is under pressure, contains from 200 to 2,000 cells, 60 to 90 per cent. being polymorphs. Fatal cases lapse into coma and do not recover consciousness. Of the 38 cases suspected and proved 25 have already been fatal.

"The pathology is characteristic. There is a severe, diffuse acute meningo-encephalitis, the perivascular spaces, and to a less degree the meninges, being infiltrated by polymorphonuclear and mononuclear cells. The destruction of nerve-cells is widespread. Thrombi are found in the small spaces of the brain. A method of laboratory diagnosis for this disease before death is badly needed, the only proof available at the present time being cultures from brain tissue. Experimentally both the mosquito and the tick can convey the infection. The natural vector is unknown.

"The chairman, Professor J. A. Doull, reminded the audience that equine encephalomyelitis had first been described by Dr. Karl Meyer, of the Hooper Foundation, in 1930, and called upon him to open the discussion. Dr. Meyer said that in retrospect there could be no doubt that there had previously been human cases in California. He believes that there is a host in nature from which both the human and horse cases are derived. Sub-clinical infection occurs in horses, as is shown by the development of immunity. As in poliomyelitis, animals can be infected by spraying the nasal mucous membrane, but he hoped that no attempts to control the spread of infection by nasal sprays might be made as had been done for poliomyelitis.

"Professor John E. Gordon, of Harvard, added the information that no multiple cases have been found in families. No case has definitely been traced to human contact nor has any intimate contact of a case with horses been established. The mouse has proved highly susceptible to the virus, and Dr. Fothergill has recovered it from the brain of a sick pigeon."

Correspondence

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

All correspondence must bear the name and address of the contributor for publication.

The views expressed in letters addressed to the Editor represent the personal view of the writer only and must not be taken as expressing the opinion or having received the approval of the N.V.M.A.

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THE LOVEDAY REPORT

To the Editor of the Veterinary Record

Sir,—I had not intended to trouble you further with my views, but as Mr. Ware writes in his letter of December 17th that Glasgow Veterinary College stands to benefit very greatly financially from the report, I wish to let him know that my interpretation of the report is very different.

They propose an entirely new arrangement, a completely new staff, and no provision for the existing students. No grant is to come to the present college.

Instead they recommend a grotesque arrangement, with a pass science degree granted after three years' teaching in the existing departments of Glasgow University, labelled, but only labelled, a B.Sc., in Veterinary Science, to be followed by two years in a suburban field station, during which the whole of animal husbandry and veterinary science are to be taught. What have we done to deserve such contempt?

Glasgow College is one of which not only its alumni but also the whole veterinary profession of Great Britain should be very proud: alone, without government help and in spite of government efforts to close it, it has held a standard of teaching second to none: its graduates hold their full share of the highest positions in public and private veterinary life. These splendid results have been very largely attained by the self-sacrificing, underpaid efforts of the part-time staff. The Committee had all this in evidence and yet they propose to inflict on them the abominable treatment recommended on page 72 of the report.

I should not have written this had not Mr. Ware said that we stand to benefit.

Yours faithfully,

A. W. Whitehouse,
Principal.

Glasgow Veterinary College,
83, Buccleuch Street,
Glasgow, C.3.

December 21st, 1938.

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CATTLE DISEASES AND MILK

To the Editor of the Veterinary Record

Sir,—I have never read a more logical, common-sense, knowledgeable and concise paper on the above subject than that of Mr. Brennan DeVine appearing in your issue of December 17th. In my opinion it is a classic of its kind. It shows plainly and forcibly the very real difficulties and obstructions to be overcome in this country in stamping out tuberculosis and contagious abortion. All arguments and actions against these two diseases should centre round the cardinal points brought out in the paper if any semblance of effectuality is to be produced. Especially do I like the stress put on *the maintenance of the health of the cow*. This is the primary stanchion in the carrying out of the tenets of *preventive medicine*. It is a point frequently boggled heretofore and infrequently given due importance in the present.

Mr. Masheter's recent statement about the end-result happenings to milk is known to most of us and in routine inspection such things as warts on cows' teats, furunculosis, milk fistulas, uterine and vaginal discharges ought not to be overlooked but should receive attention.

One wonders if up to now there is any real advance in the veterinary supervision of the bovine population of this country. As one travels about one can hear of whole areas where there is no periodical examination of the dairy cows. The real functioning of the Animal Health Department seems very slow in eventuating and to be short of life or somnolent.

Yours sincerely,

G. Mayall.

Bolton.